

# THE RAILWAY GAZETTE

Price: Two Shillings

FRIDAY, JUNE 2, 1961

Annually £5 by post



## EAST AFRICAN RAILWAYS

The illustration shows two of the new 'Class 90' Diesel-Electric locomotives now in service with the East African Railways.

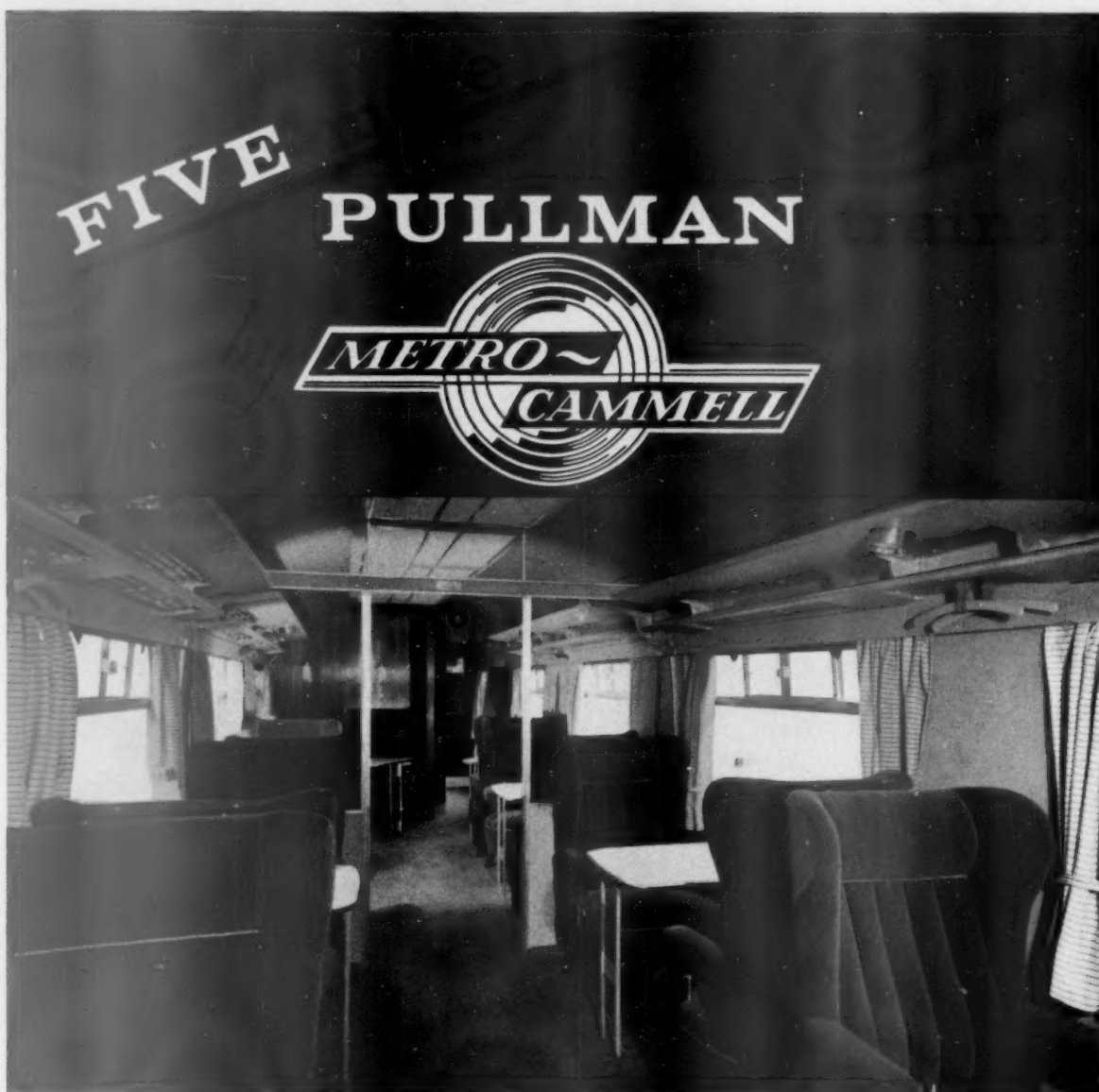
These locomotives, built by The English Electric Co. Ltd., in conjunction with their associates, Robert Stephenson and Hawthorns, have the 1 Co-Co 1 wheel arrangement, well suited to the local conditions. The gauge is 1 metre, convertible to 3 ft. 6 in.

All axles run in Timken bearings, mounted in

axleboxes and cannon-boxes also supplied by the bearing manufacturer.

British Timken, Duston, Northampton, Division of The Timken Roller Bearing Company. Timken bearings manufactured in England, Australia, Brazil, Canada, France and U.S.A.

**TIMKEN**<sup>®</sup>  
REGISTERED TRADE MARK  
**tapered roller bearings**



Following the Diesel Pullmans, Metro-Cammell has now supplied ALL the Rolling Stock for:

- THE "MASTER CUTLER"
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# FLEXIBLE BEARINGS

*for*

**TRACTION LINKS, RADIUS RODS,  
BOLSTER HANGERS, CENTRE  
PIVOTS, SIDE-BEARERS, RESILIENT  
DRIVES, MOTOR NOSE SUSPENSION**

Metalastik components eliminate direct metal-to-metal contact and thereby cut out wear, noise and the need for lubrication. With a wide range of units to choose from, it is possible to provide for movement in any desired direction, yet with ample constraint in others.

The wealth of Metalastik experience, coupled with adaptability of design and manufacturing technique, has been successful in combining a smoother ride with a remarkable degree of simplification and weight-saving.

Among valuable components are:

- (1) The Spherilastik Bearing, permitting three-dimensional movement, for use as pivots. One of the many applications of these bearings—each end of a traction link fitted to a Werkspoor bogie—is shown below.
- (2) The Metalastik Ultra-Duty Bush, accepted in every branch of engineering as the ideal component for meeting oscillating movement and misalignment without lubrication.
- (3) The Divided Roller Pivot, permitting a hinge-like movement, together with end location, for swing hangers.
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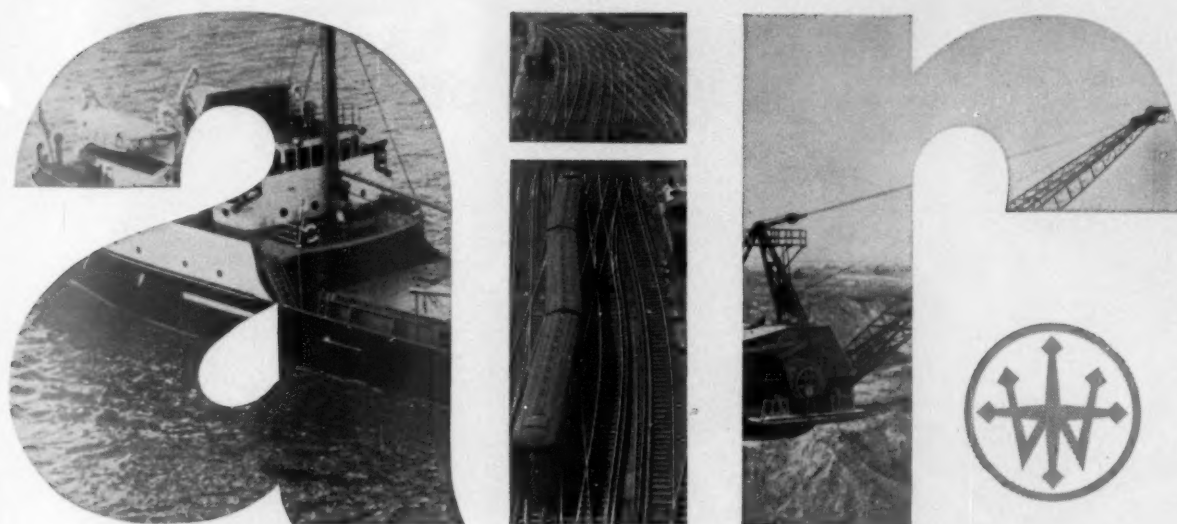
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23-ton 117 h.p. special type Planet Diesel Fluidrive shunting locomotives at the North Thames Gas Board's Backton Works, two of eight now being supplied.

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KG6

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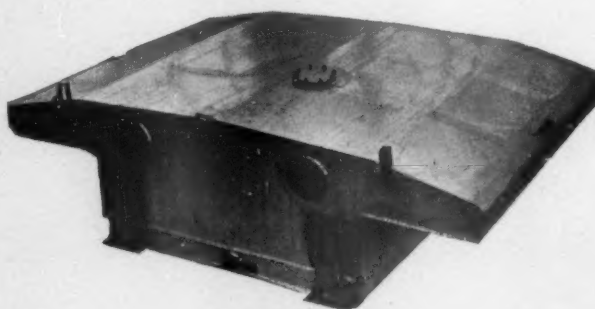
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If you've a weight-saving or heat-transfer problem on your mind, bring it to Marstons.



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Long experience in this field enables Marstons' designers and technicians to find the quickest and best route to the solution of your problems.



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MACHINE TOOL EXHIBITION,  
BRUSSELS—SEPT. 2 to 12.

*...With the compliments of*

Exceptional performance from an odd drill in a batch are of little value to the regular user of Twist Drills. Multiple drilling, repetitive drilling, production drilling, demand consistency in the working life of each tool, therefore the capability of striking extra holes from every drill is an obvious advantage. The manufacture of DORMER DRILLS is keyed to this very principle.

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DORMER TOOLS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS





*This lorry... could be up there  
if only it were a Roadrailer!*



What have roads got that railways haven't? Door-to-door service on the same vehicle. They also have something else—traffic jams! These can make a potentially fast service into a frustratingly slow one.

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Feed railheads by road; trunk between railheads by rail. That makes sense. And now the Roadrailer can achieve it as a practical, profitable proposition.



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**150 SECONDS — YOU CAN HAVE THE BEST OF BOTH WORLDS**

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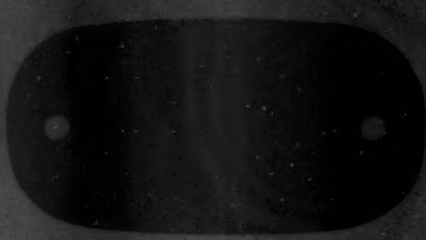
of trains  
every year  
run more  
smoothly  
on



# WALKER'S RAIL PADS



F.C.9 RAIL PAD



F.C.5 CHAIR PAD



Photographs by courtesy of British Railways

Appreciating the tremendous punishment meted out to the permanent way Walker's, in close co-operation with Permanent Way Engineers, have pioneered and developed a range of special Bonded Cork Pads for concrete sleepers, longitudinal bridge timbers, points and crossings, high speed curves, diesel pit installations, bridge bearers, electric signal insulation, etc.

*Technical information available on request.*

## F.C.9 RAIL PADS

For F.B. rail on baseplates or sleepers

## F.C.5 CHAIR PADS

For use between baseplates or chairs, and softwood sleepers



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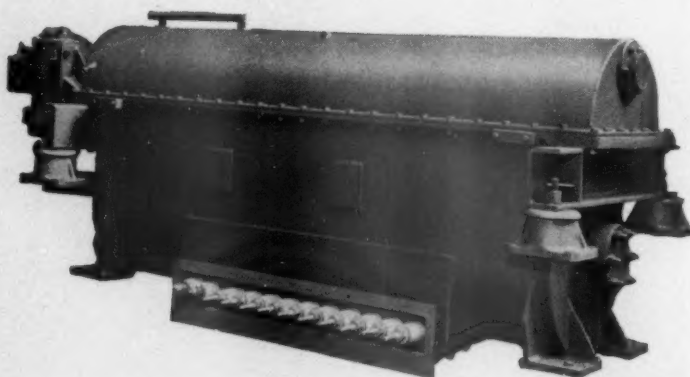
DEPOTS THROUGHOUT THE WORLD



## SILENTBLOC mountings in new B.R. electric stock

The multi-unit motor coach illustrated is one of a group of 71 such units built at York and Doncaster with electrical equipment by the General Electric Company Ltd.

The G.E.C. 1,000 kVA transformer and two reactors (as shown here) are carried on Silentbloc anti-vibration mountings. These motor coaches provide the power for 3 or 4 coach multiple-unit trains on the Eastern Region Suburban lines.



# SILENTBLOC

ANTI-VIBRATION MOUNTINGS



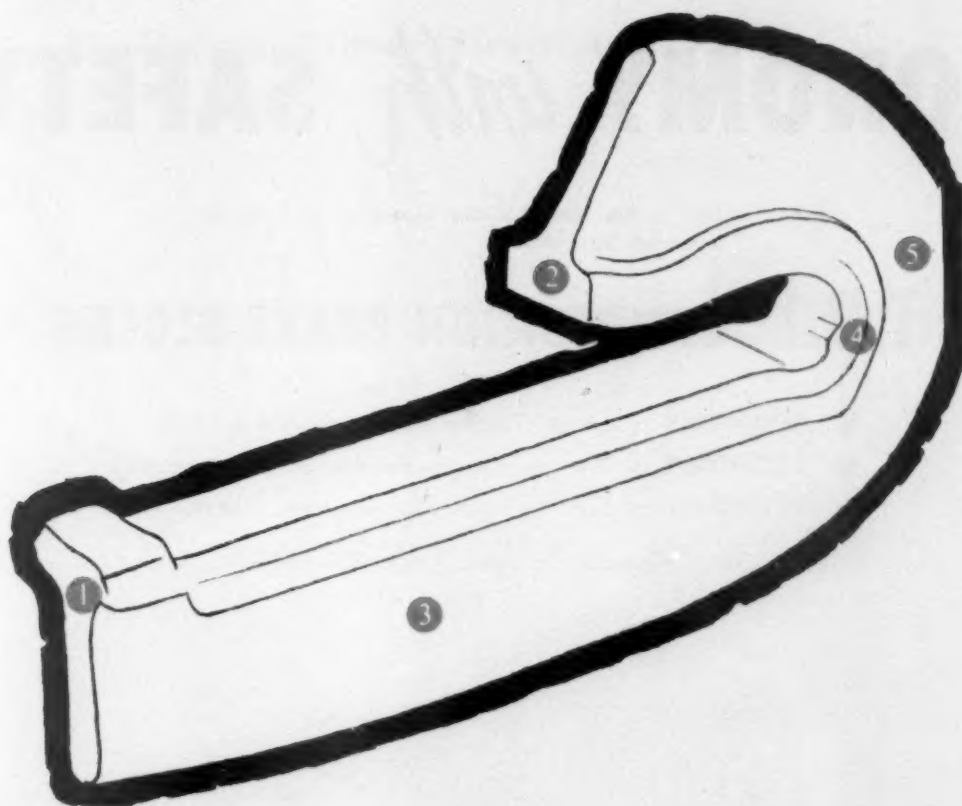
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Five important features which make the FAIR T the most reliable appliance for prevention of rail creep.

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- ④ Overdrive Stop prevents damage by overdriving.
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—and **SAFETY** assured by 25 years of experience backed by constant research and improvement



Photo by courtesy of British Railways



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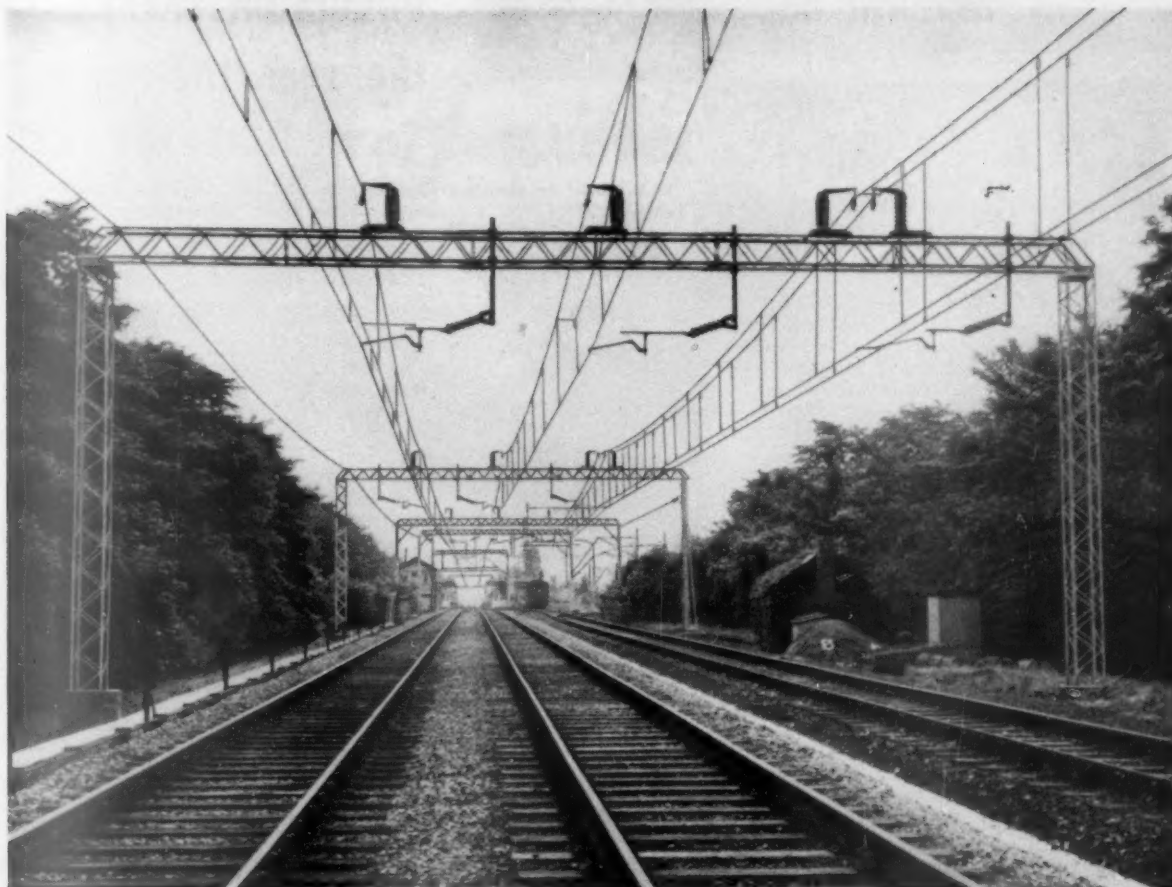
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BRANCHES AND AGENTS THROUGHOUT THE WORLD

## Railway Electrification



*Published by courtesy of the main contractors  
Messrs. British Insulated Callenders Construction Company Limited.*

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British Railways (conductor rail, overhead AC & DC)  
London Passenger Transport Board (conductor rail)  
Argentine Railways (conductor rail)  
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Bolivian & Chilean Railways (conductor rail)  
Indian Railways (overhead)  
New South Wales Railways (overhead)  
Polish State Railways (overhead)  
South African Railways (overhead)  
Victorian State Railways (overhead)

Bullers Limited have supplied insulators and metal fittings for railway electrification schemes (Conductor Rail and Overhead Systems) during the past 50 years.

The above illustration of the British Railways 25 kV. A.C. system is one of the latest schemes on which Bullers insulators and fittings have been used.



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**PRECISION LATHES**  
the versatile

**POWER**

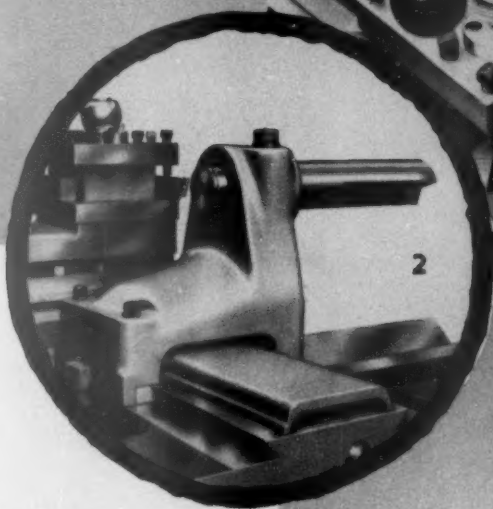
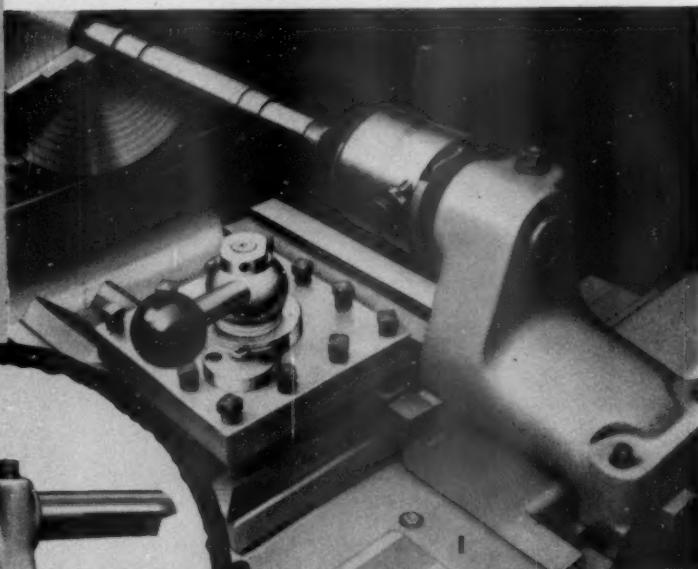
## DRILLING ATTACHMENT

is supplied as standard equipment on all D.S.G. centre Lathes except when D.S.G. copying units are built in enabling various operations such as Drilling and Boring to be carried out from the saddle position using normal longitudinal power feeds.

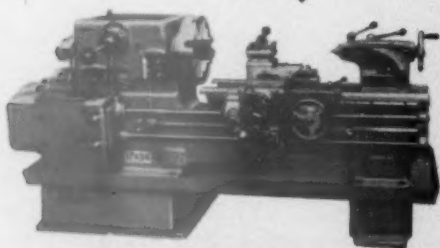
**OPERATOR FATIGUE IS REDUCED — PRODUCTION INCREASED**

The power drilling attachment can be used for mounting drills, boring bars, reamers or dieheads and operations can be carried out using either hand traverse or power feed giving distinct advantages over the use of the Tailstock. Improved pitch accuracy is obtained when using the diehead with full leadscrew control.

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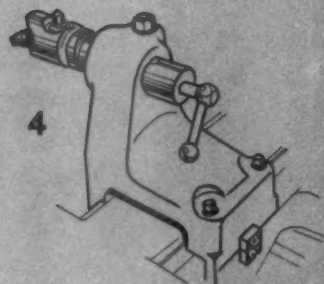


Type 17 inch centre lathe ▼



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1. Diehead
2. Core Drill
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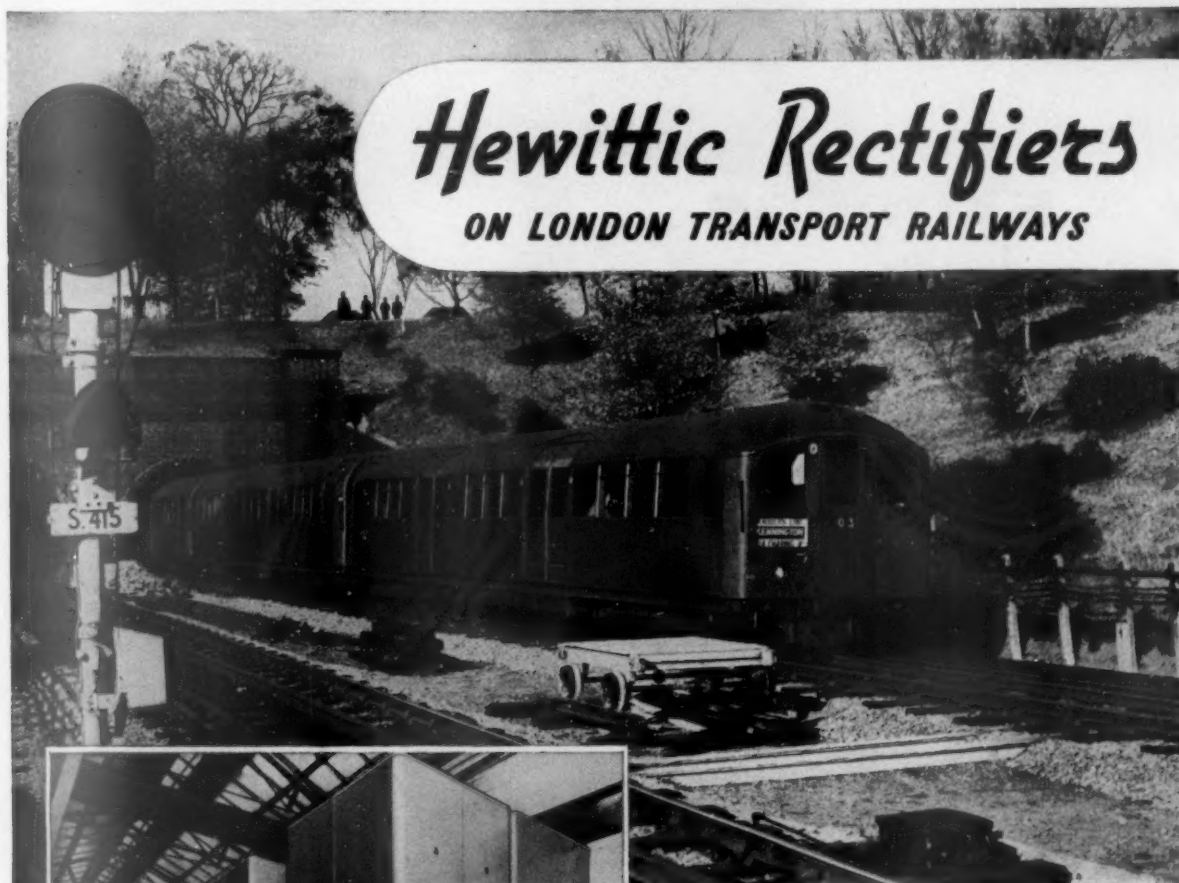
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The illustrations show a train on the Northern Line at Hendon and the 4,000 kW substation at Bond Street (Central Line) equipped exclusively with Hewittic Rectifiers. The plant comprises four 1,000 kW combined rectifier and transformer units, the transformers being totally enclosed air-cooled. This Company is also responsible for the supply and installation of all A.C. and D.C. control gear at this substation. Some 90,000 kW of Hewittic Rectifiers have been supplied to the London Transport Executive.

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In World Wide Service**

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Cut out standing time—keep freight moving and increase terminal handling efficiency with NEAL, the crane with the really robust, direct diesel-mechanical transmission.

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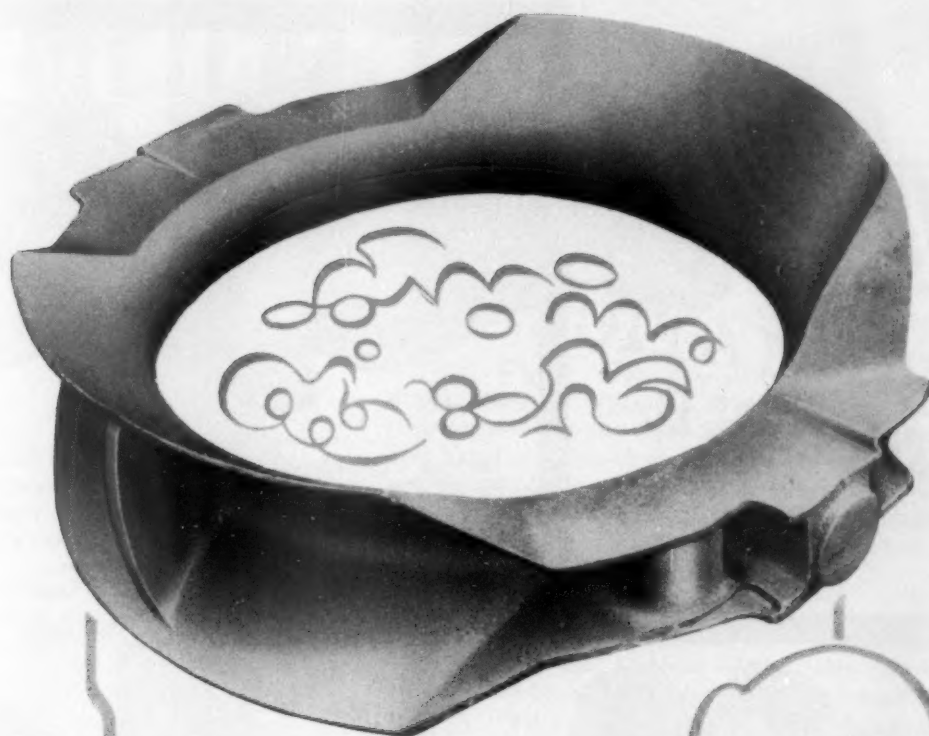
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*The name behind the best Cranes*





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THE  
BEST...  
...STEEL  
CASTINGS  
COME  
FROM  
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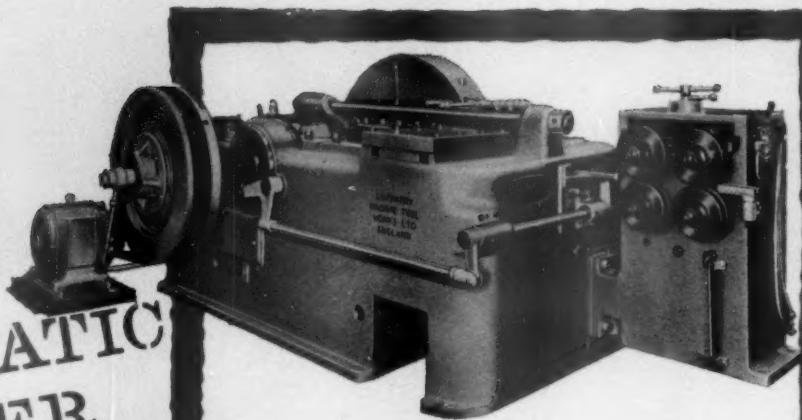


Technical Brochure from

**JOHN FOWLER & CO (LEEDS) LTD** Sprotborough Foundry, Sprotborough, Doncaster



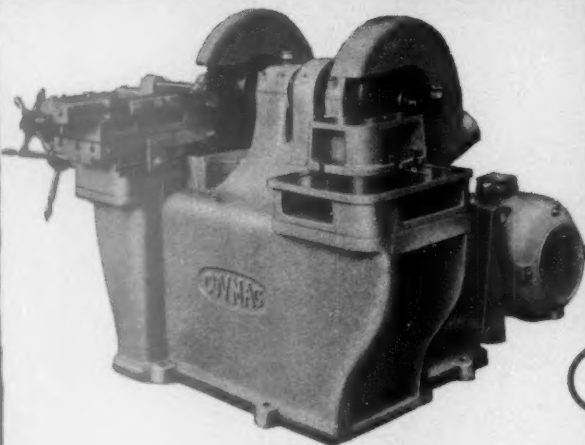
## AUTOMATIC FORGER



*No. 2 machine with guards removed.*

The stock is placed between the rolls and is then fed through the dies to the workstop. The die then closes, cutting off the stock to the required length, and delivers it to the heading position. The heading tool then completes the forging, which falls down the chute and is taken away by conveyor.

The Automatic Forger can be supplied in several sizes and for making balls of up to and including 4 in. diameter.



*No. 3 machine illustrated.*

These machines are made in three sizes. The smallest handles bars up to 2 in. diameter. The largest size, as illustrated, takes bars up to 4 in. diameter. They are an invaluable asset to any forging or drop stamping plant.

We also make nine sizes of Standard Upsetting

Machines to take bars from  $\frac{3}{4}$  in. to 6 in. diameter.



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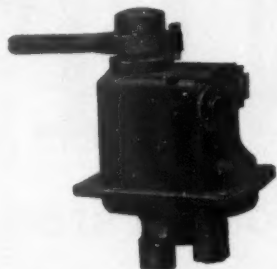
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# METCALFE'S

## AIR BRAKE EQUIPMENT

*for Locomotives*

OERLIKON PATENT  
DESIGN



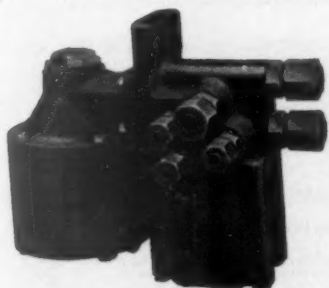
**TYPE FV.3** An Automatic Driver's Air Brake Control Valve suitable for medium length goods and passenger trains or railcars, etc. This Valve is simple to operate and of light weight construction. It enables the full benefit to be obtained from modern step-by-step application and release of air brakes. Leaflet A.1.



**TYPE FV.4** A standard Driver's Automatic Air Brake Control Valve with automatically controlled high pressure brake releasing impulse. This Valve enables the maximum speed of brake release to be obtained, and in addition enables the full utilisation of all the advantages associated with modern air brakes. The Valve is reliable in service and simple to operate and maintain and is especially suitable for long express passenger and goods trains. Leaflet A.4.



**TYPE FD.1** This is a simple Brake Control Valve suitable for direct braking or shunting brake requirements. It is very simple to use and accurate in operation. The type FD.1 Valve can also be adapted for the control of the Diesel engines and can also be made suitable for cam operation. Leaflet A.13.



**TYPE LST.1** A locomotive Triple Valve of modern and simple design. The LST.1 Operating Valve embodies a control for freight or passenger train operation, together with a high efficiency Brake relay, also an Anti-skid Brake device may be provided when required. This Valve is capable of controlling the air supply to several Brake Cylinders when required. Leaflet A.2.

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today ...

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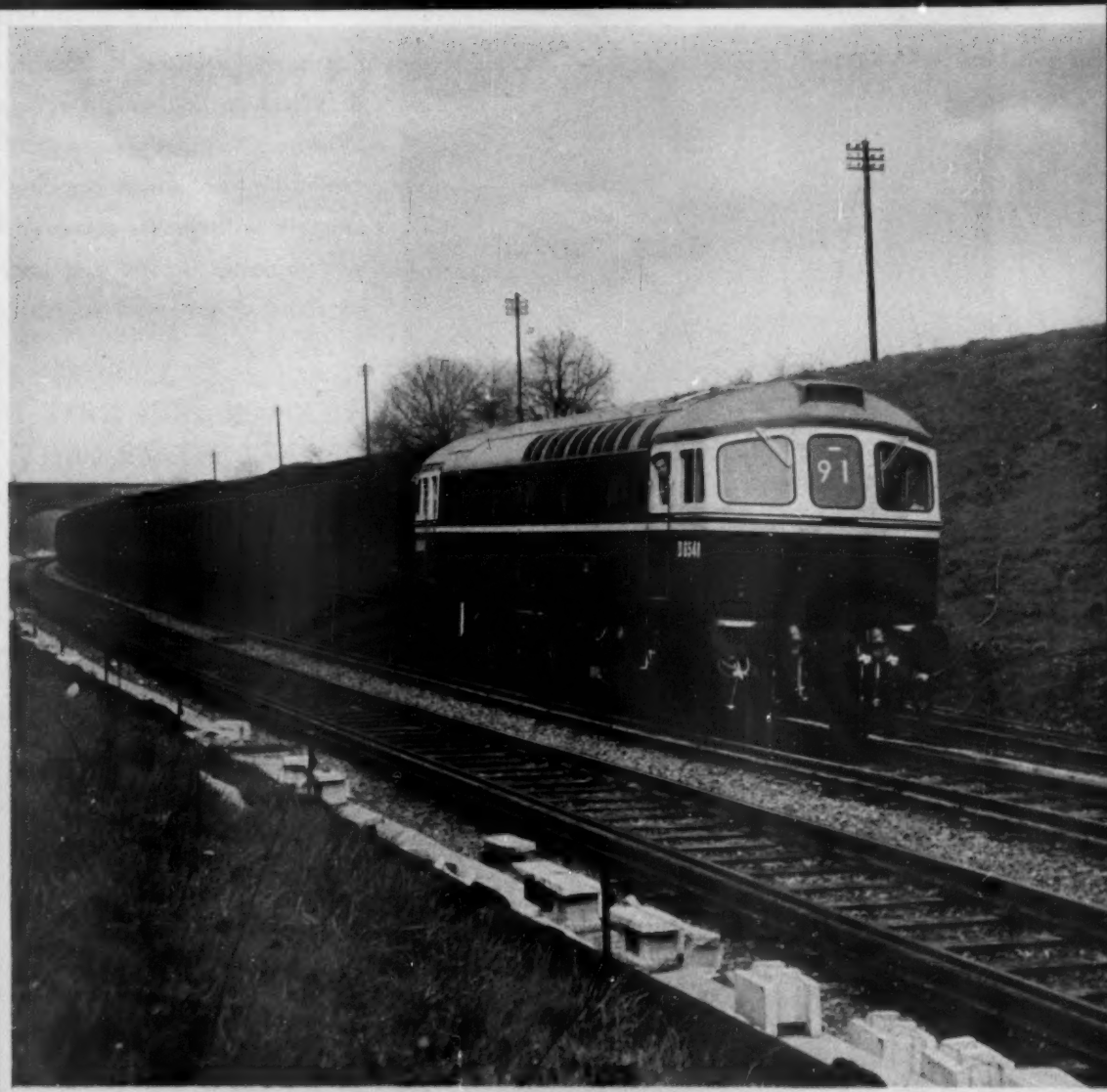
For more detailed information about Dragonite and how it might fit in with your production plans, please write for a copy of the Dragonite Technical Handbook to:



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# SULZER



## 4

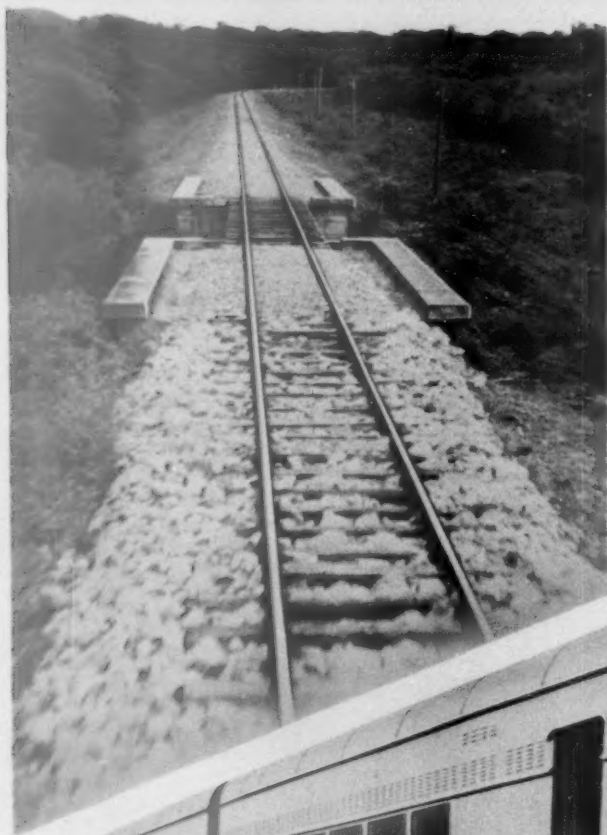
### **SOUTHERN REGION**

#### **BRITISH RAILWAYS MODERNISATION**

98 of these Type '3' locomotives with 1,550 h.p. Sulzer engines are being supplied to Southern Region. The modernisation plan so far calls for 603 Sulzer Rail Traction Engines totalling over one million h.p.

**SULZER BROS. (LONDON) LTD.  
31 BEDFORD SQUARE, LONDON, W.C.1.**

# Economy along these lines



of the C.M.F. Brasileiro-Boliviana has been furthered by the introduction of Wickham lightweight railcars. Wickham Stressed Frame Construction, producing cars which combine great strength with power-economy lightness, is a principle proved and appreciated on some of the most rugged railways in the world.

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240 b.h.p. twin-engined  
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Specialists in the design and construction of Lightweight Diesel Railcars and Railbuses, Inspection and Track Maintenance Cars, Overhead Line Inspection Trolleys and other Special Purpose Vehicles, Hand Cars and Track Tools.

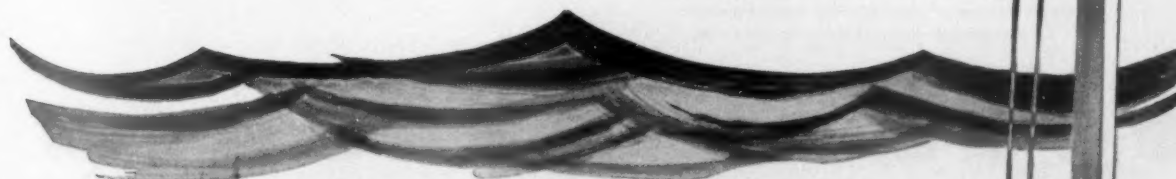


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**HEAVY-LIFT TRANSPORTATION**



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World-wide service  
Lifts up to 200 tons



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**the big lift....**

**Cowans Sheldon**  
**250 Ton Diesel**  
**Railway Breakdown crane**

There's BIG capacity for hard work in this Cowans, Sheldon 250 Ton Diesel-Hydraulic Breakdown Crane. This, the largest railway crane to come out of Great Britain, was completed in 9 months, and together with a smaller 150 ton version, is for the Quebec Cartier Mining Company. For reliable Cranes of all types, and for speedy delivery, consult Cowans Sheldon, the Crane Specialists.

**DIESEL AND STEAM BREAKDOWN CRANES**  
**HEAVY RAILWAY WORKSHOP EQUIPMENT**  
**DOCKSIDE AND SHIPYARD CRANES**

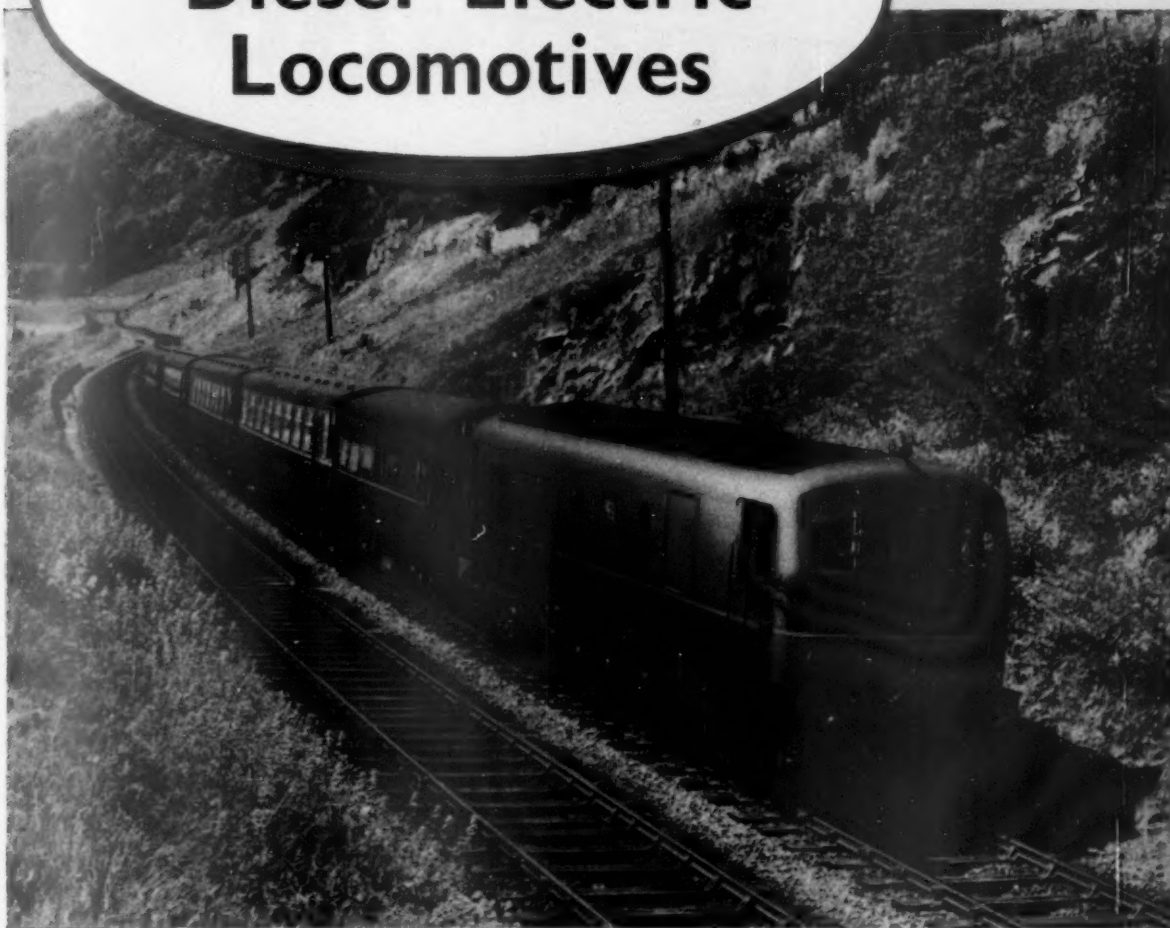
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P5742B

# AEI Diesel Electric Locomotives



One of 94 complete diesel-electric locomotives supplied to Coras Iompair Eireann (Ireland's Transport Company), by AEI, who have supplied diesel-electric and straight electric locomotives throughout the world.

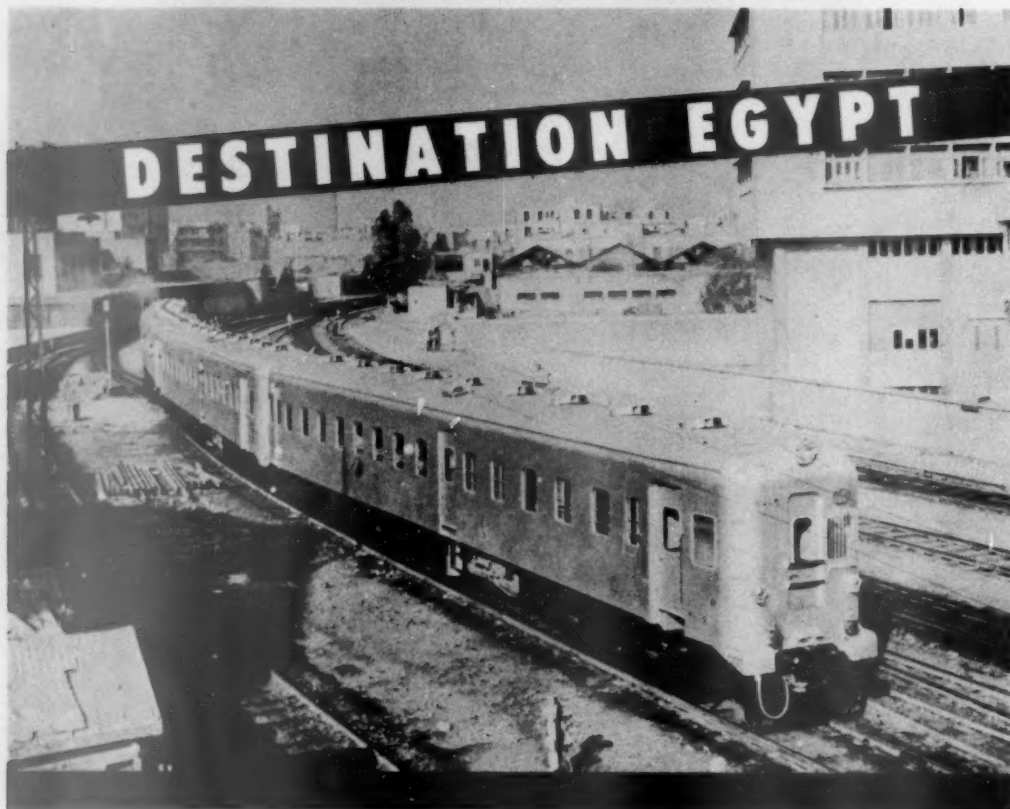
*All enquiries should be addressed to the local AEI Office or direct to AEI Traction Division, Trafford Park, Manchester 17.*



**Associated Electrical Industries Ltd.**  
**Traction Division**  
**MANCHESTER AND LONDON**



# HITACHI



1. Gauge of track .....  
4 ft. 8½ in. (1,435 mm.)
2. Seating capacity —  
2nd class..... 24 seats  
3rd class..... 100 seats
3. Tare weight .....approx. 45 tons
4. Leading dimensions.....  
Length (between coupling faces)  
25,525 mm.  
Overall width ..... 2,760 mm.  
Overall height (above rail level)  
4,430 mm.

The first 20 units of 350 Diesel-powered cars for the Egyptian Railway, U.A.R., were completed in January 1960 at Hitachi's Kasado Works. Up to October 1960, 90 cars have been delivered in total and these cars are now in their service operation with complete satisfaction of the customer.

The 350 cars are composite units, with provision for one 2nd class and two 3rd class compartments with driving cabs at each end. They can be operated independently or in a train of up to four cars as required.

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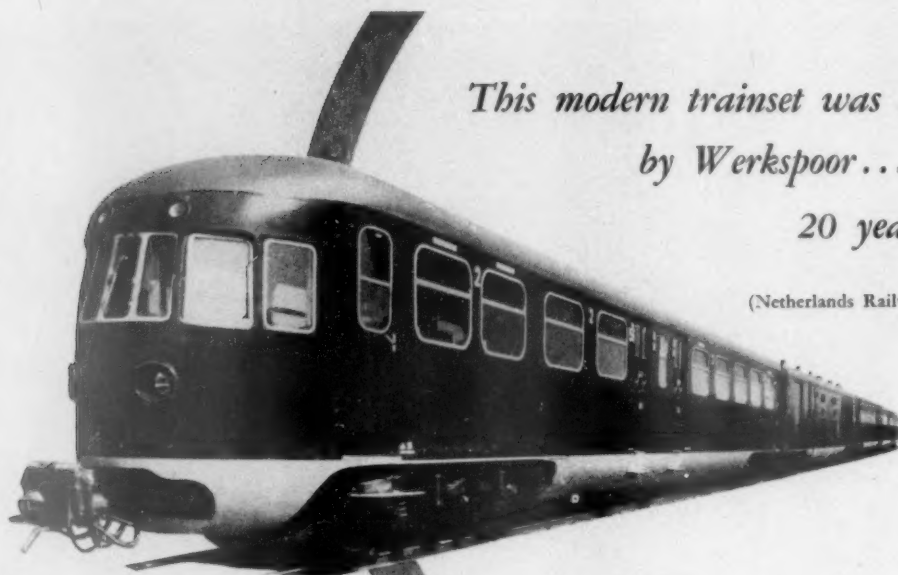
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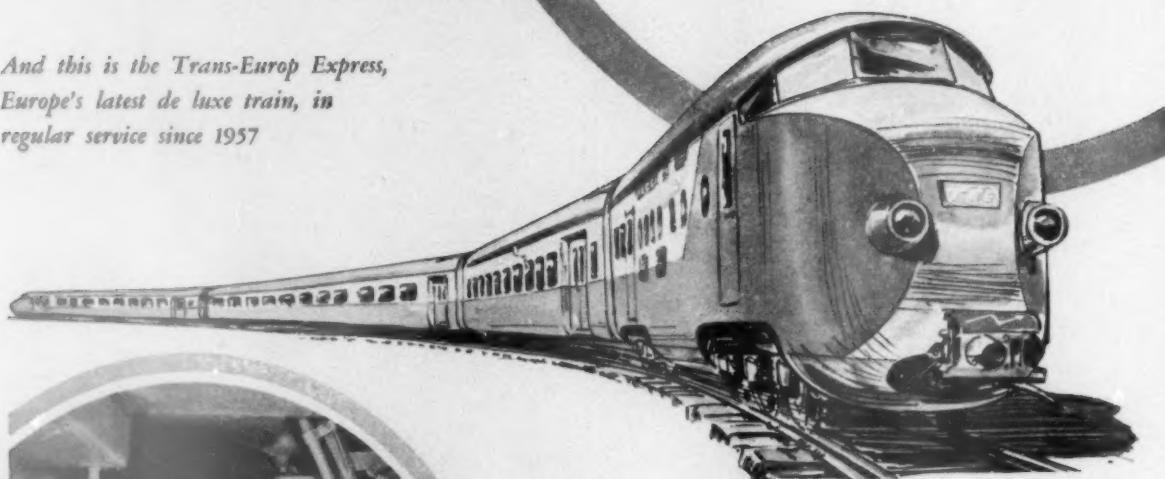
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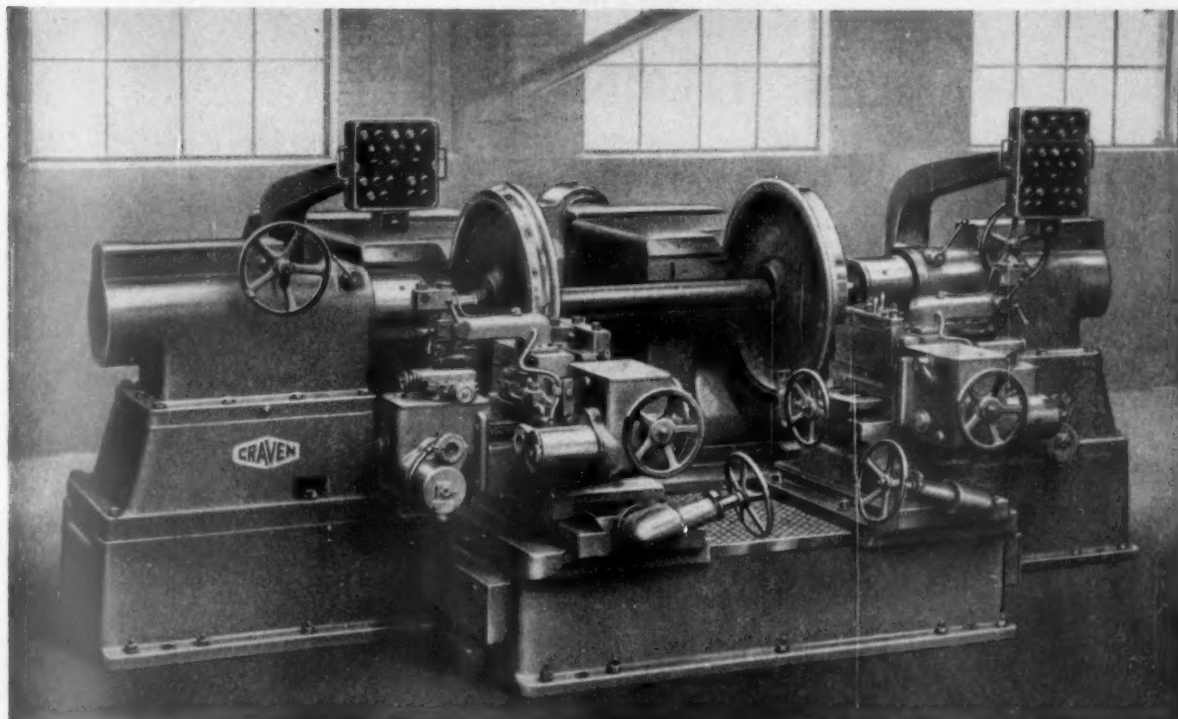
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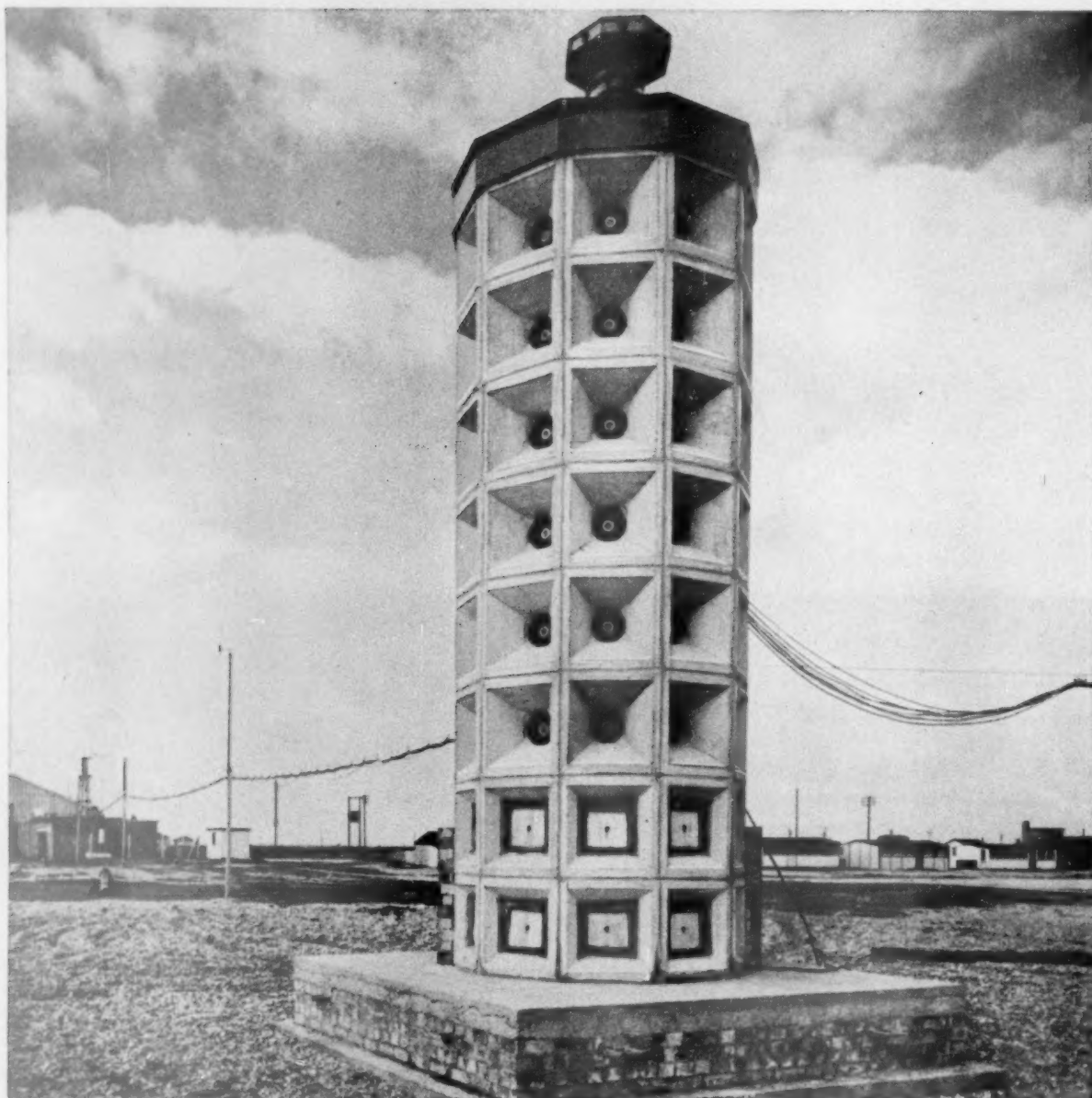
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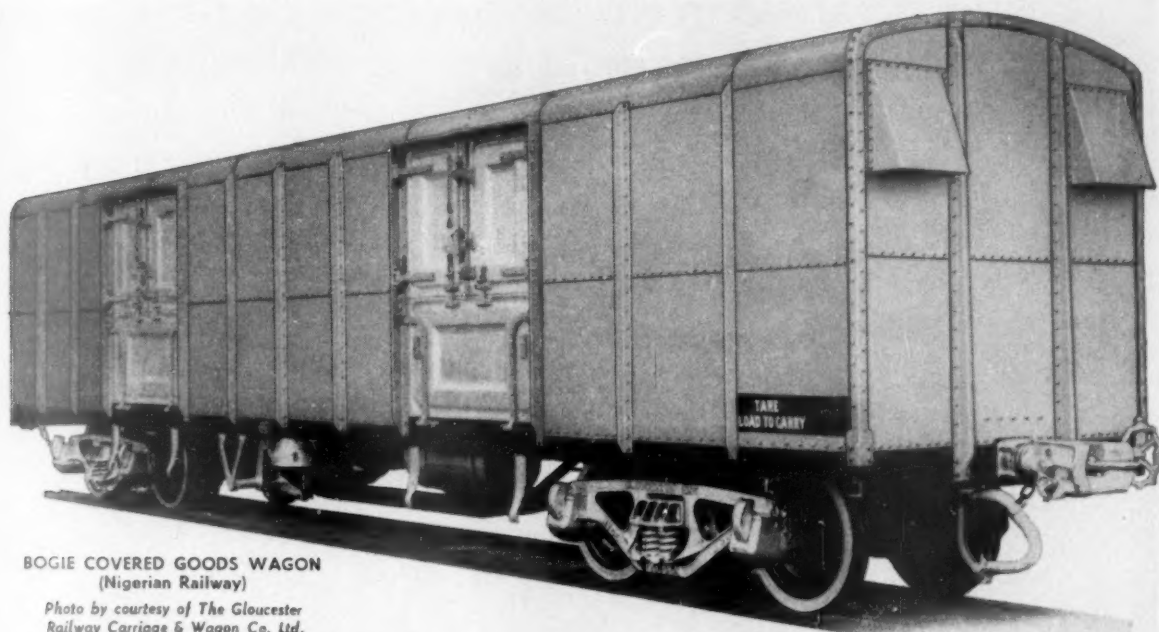
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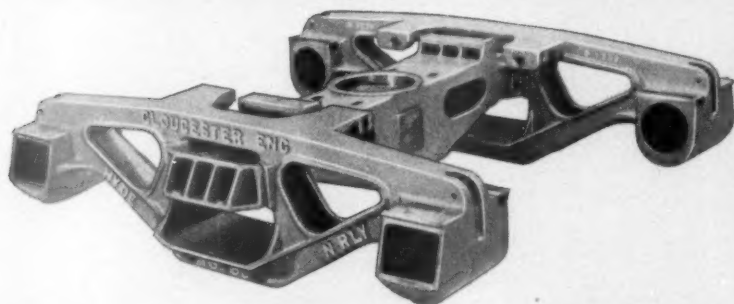
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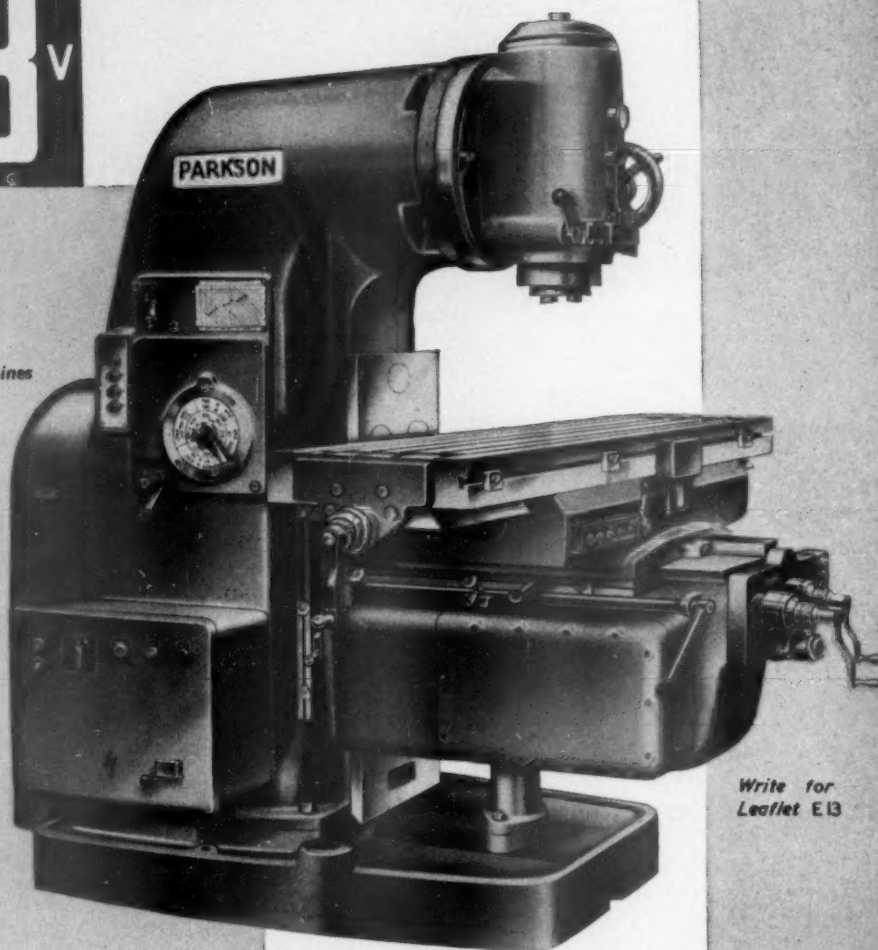
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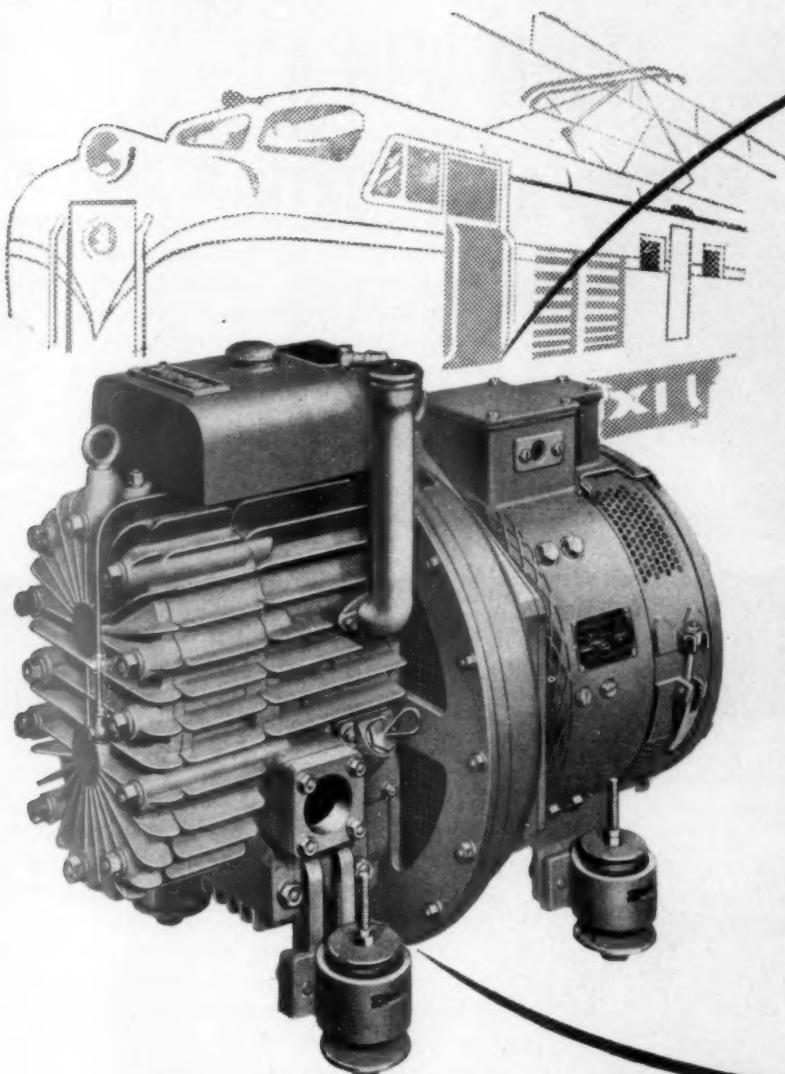
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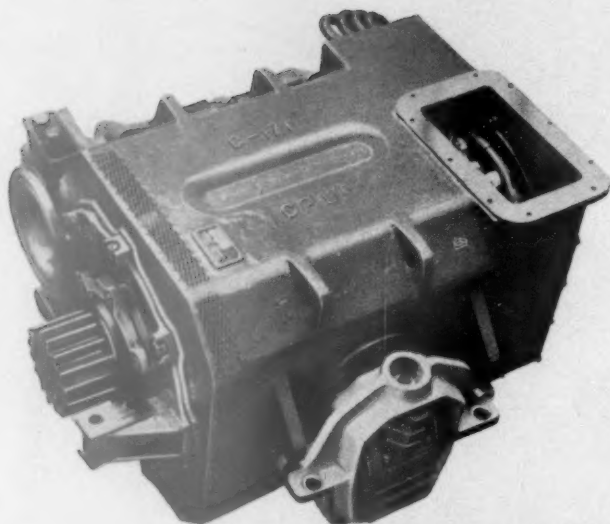
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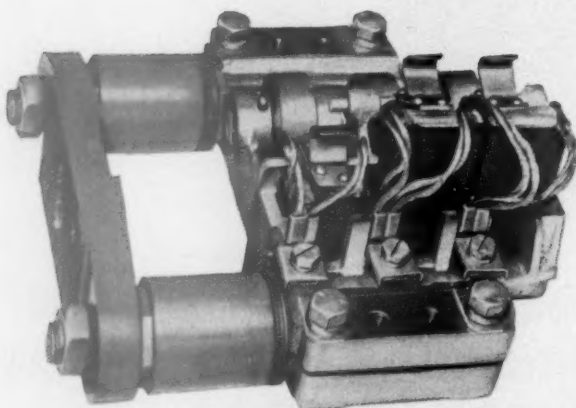
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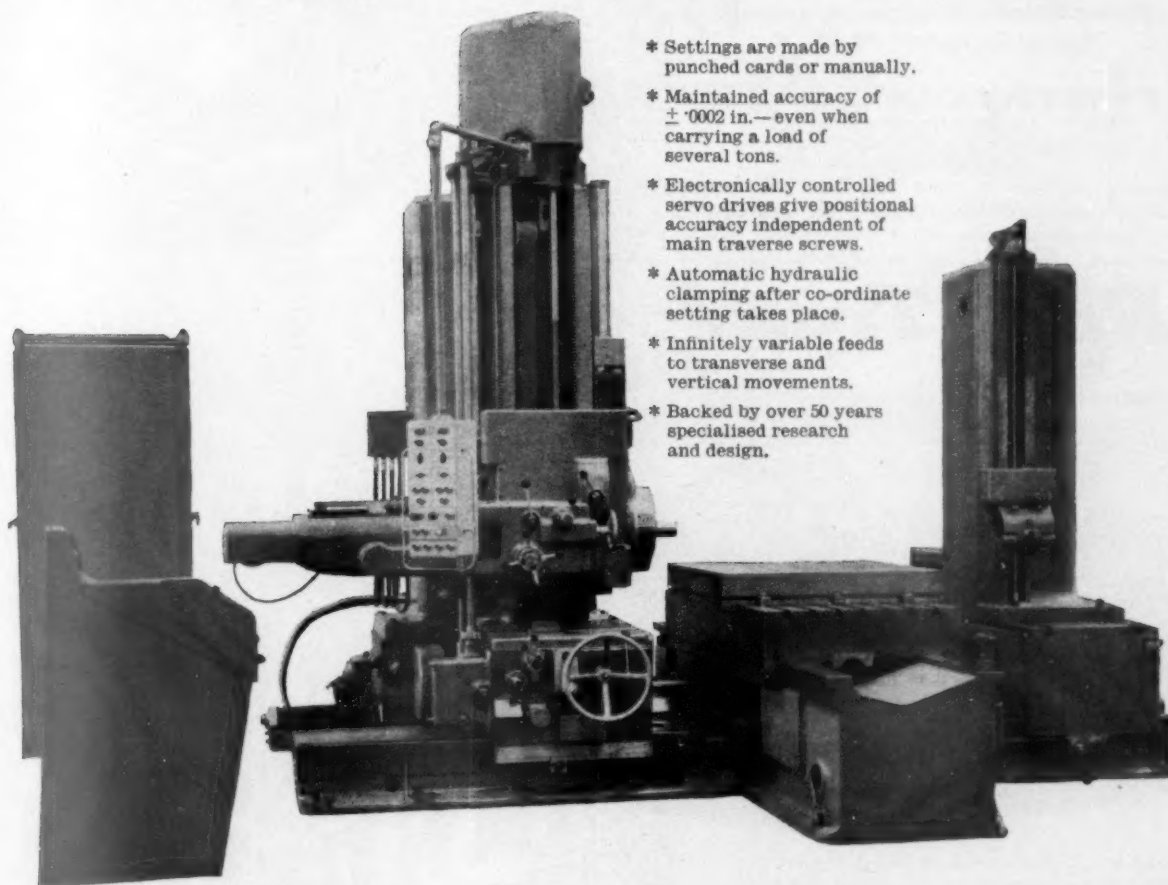
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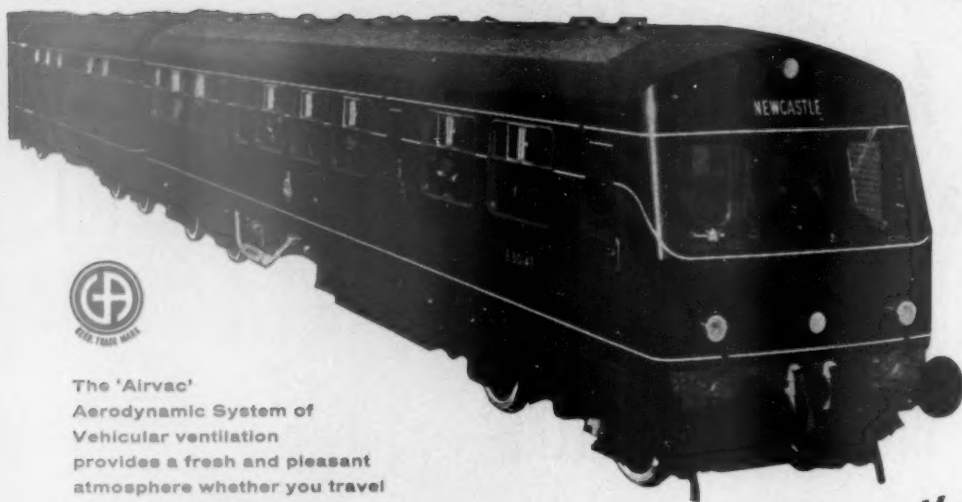


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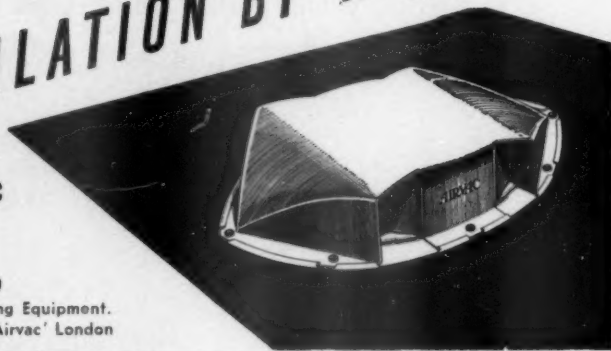
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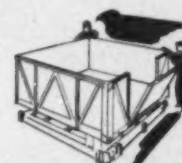
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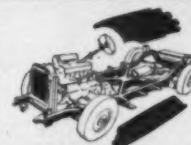
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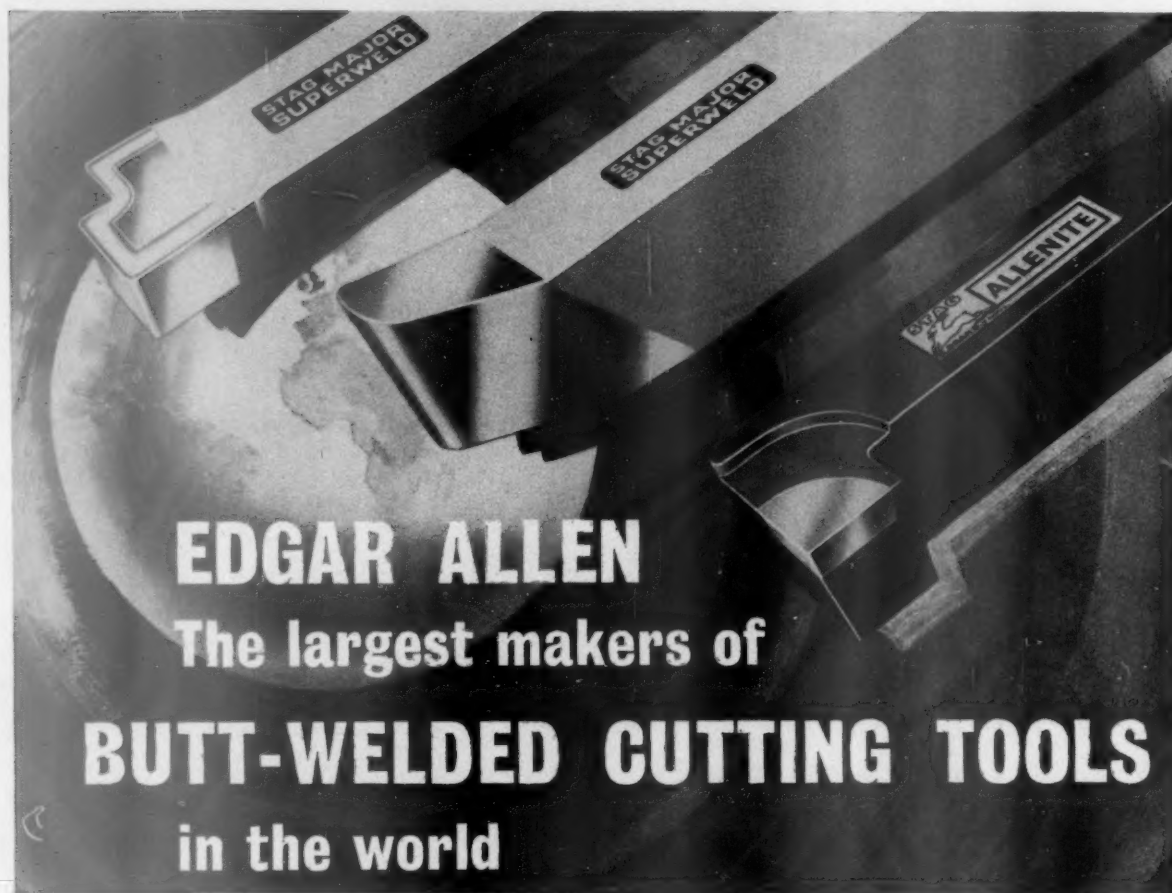
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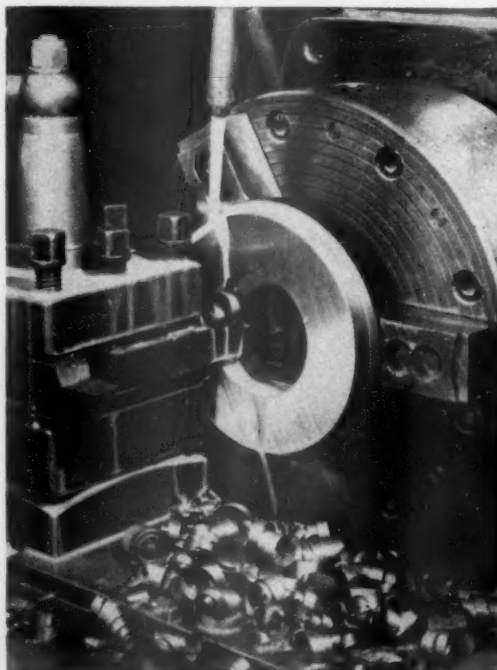
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A Journal of Management, Engineering and Operation

VOL 114

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No. 22

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## Promoting railway exports

THE endeavours by the Government and the British railway engineering supply industries to promote export business at the present time are receiving a great deal of support from the United Kingdom Railway Advisory Service. This body was formed in 1959 to help the railway administrations served by the United Nations Economic Commission for Asia and the Far East to solve problems arising in all spheres of railway activities and to inform them of technical developments on British Railways and in the British railway manufacturing industries. Since then it has greatly extended its activities. Now, it not only enables railways in the area covered by E.C.A.F.E. to profit by the experience of British Railways' technical staff; it is available to railways of any nation which might wish to benefit from the marked technical progress which is taking place in this country. The service functions under the auspices of the International Inland Transport Branch of the Ministry of Transport and enjoys the co-operation

of the British Transport Commission, British Railways, and the railway equipment industry. Within recent weeks U.K.R.A.S. has devoted a good deal of its time and services to the Minister of Transport for Malaya, who, on a visit to this country, has been shown many of the developments on British Railways and the progress which is being made in the works of British manufacturers of transport equipment. Similar facilities have been offered to Mr. G. W. W. Chalk, Minister of Transport for Queensland, who has been visiting this country. The value of the United Kingdom Railway Advisory Service at the present time could be inestimable in promoting business with overseas railway administrations.

## Knowledge gained in modernisation

SOME of the ways in which this service could be of value were outlined by Mr. F. G. Hathaway, President of the Institution of Railway Signal Engineers, in his presidential address to that institution. Mr. Hathaway is an indefatigable promoter of export business. He is convinced of the urgent necessity for everyone engaged in the railway signalling profession—and the same applies to all other aspects of railway manufacture—to be more internationally-minded. With justification he feels that both British Railways and the railway supply industry should combine to make known as widely as possible the knowledge and experience gained in the modernisation plan now in progress, and in many cases reaching fruition, on British Railways. Mr. Hathaway was the signalling member of the U.K.R.A.S. mission to Pakistan last July, and he has cited this as an excellent example of a team combining the knowledge and experience of all aspects of railway working.

## Combating difficulties overseas

WHEN he spoke to the members of the institution, Mr. Hathaway dealt at some length with the impressions he had gained personally by visiting Southern Africa, particularly South Africa, Rhodesia, and East Africa, and he indicated clearly how much was being done in a part of the world where conditions of climate, transport, and labour were very much more difficult than they were in this country, but where those conditions were being met and overcome with real success. He demonstrated how mainly British-designed and manufactured equipment had been successfully applied and operated to meet very arduous conditions, and he expressed his sincere belief that, despite many claims to the contrary, British workmanship in these fields was still the best. Nevertheless, he emphasised that only by a combination of effort and an international outlook would it be possible to keep Britain and her railway supply industries to the forefront in the present conditions of ever-increasing intensive opposition from many industrialised countries.

## E.A.R. & H. General Manager

MR. G. P. G. MACKAY, who has been appointed General Manager of the East African Railways & Harbours, in succession to Sir James Farquharson, has been Deputy General Manager

of the system for the past year and for some time has taken a prominent part in the administration. He joined the East African Railways 20 years ago after two years special training in the former London & North Eastern Railway. As Chief Operating Superintendent he was responsible for the introduction of the faster overnight passenger services, which are a feature of the E.A.R. & H. timetable between Mombasa and Nairobi, and between Nairobi and Kisumu. He was jointly responsible with the Chief Mechanical Engineer in the production of a report on the possible use of diesel or electric traction on the East African Railway. Some biographical details of Mr. Mackay, who is the holder of a United Nations Fellowship for the study of transportation, are given elsewhere in this issue.

### British Trade Fair at Moscow

THE British Trade Fair, which opened in Moscow on May 19 and continues until June 4, is under the joint sponsorship of the Association of British Chambers of Commerce and the All-Union Chamber of Commerce of the U.S.S.R. It is to be followed by a Soviet Trade & Industrial Exhibition to be held at Earls Court, London, from July 7-29 this year, under the same joint sponsorship. Over 600 companies are participating and there are 14 main categories of exhibits. Among the exhibitors are: Associated Electrical Industries Limited; Bristol Siddeley Engines Limited; Davey, Paxman & Co. Ltd.; Holman Bros. Ltd.; Ruston & Hornsby Limited, and the Vickers group of companies. As Sir James Hutchison, President of the Association of British Chambers of Commerce, has previously pointed out, the value of these exhibitions lies not only in the business transacted, but in the contacts established and the information exchanged. These sources of mutual benefit continue long after the last stand has been dismantled.

### Swiss Federal Railways policy

A WELL-PRODUCED tourist brochure issued by the Swiss Federal Railways, includes a statement of policy which merits attention in many countries. Entitled "The four main obligations of the Swiss Federal Railways," it summarises these as, first the obligation to operate, pointing out that remote and sparsely populated parts of the country have to be provided with several rail services a day even if passenger traffic is small and the volume of goods to be carried insignificant. Second is the obligation to keep scheduled times—and the Swiss must run their trains in accordance with published timetables. Third is the obligation to keep published tariffs and, fourth, the obligation to carry, which applies most clearly during the heavy traffic prevailing on Sundays and public holidays. It may well be that the realisation of having to meet these four obligations successfully and publicise them has had no inconsiderable effect on the successful financial results of this efficient administration.

### Commonwealth training week

AS PART of its efforts to assist in the success of the Commonwealth Technical Training Week, the Western Region of British Railways has arranged an exhibition at Paddington Station. Open from May 29 to June 2 inclusive, the exhibition has been staged in an adapted rail coach, and shows students and apprentices from the Mechanical & Electrical, Civil Engineering, and Signal & Telecommunications Departments at work on their day-to-day tasks. Functions of other branches of railway activities are illustrated by photographs and a pictorial display has been mounted on "The Lawn." The Region will also take part in more than 50 other exhibitions arranged by local authorities throughout England and Wales. At Bingley Hall, Birmingham, its contribution will occupy an area of 400 sq. ft. Activities at Cardiff will be centred in

Cathays Park, where the British Railways' stand will occupy 360 sq. ft. and where 16 railway apprentices will take part in a march-past. Swindon Locomotive Works will be opened to school-leavers and to the general public on May 29, 30, and June 1 and 2.

### Exhibition at Newcastle

LAST Tuesday, May 30, saw the opening of an exhibition of modern plant and equipment used in railway civil engineering. Arranged at Ponteland Station in the North Eastern Region of British Railways in connection with the 1961 convention of the Permanent Way Institute at Newcastle, the exhibition was opened by Mr. E. L. Triffitt, Chief Civil Engineer, North Eastern Region. Some 70 pieces of equipment are on display, illustrating the specialised plant and equipment used in modern railway civil engineering. Some of the larger items have been specially designed by or for the Region and some are the only specimens of their kind in the world. Most are being shown working. New British Railways colour films are being shown in a mobile cinema coach, and a comprehensive display of photographs and plans of the main modernisation work being carried out in the Region are also on view.

### Polish rolling-stock exports

POLAND appears to be steadily increasing her exports of railway rolling-stock and other material. In 1960 the value of stock exported rose from £20 million to £21,430,000. Some of the principal items were 360 standard- and broad-gauge and 434 narrow-gauge coaches, 3,862 wagons of various types, 70 refrigerator and 20 mail vans, and 245 electric mining and 108 steam industrial locomotives. The principal purchasers of this stock and the values of their orders were: U.S.S.R., £1,400,000; China, £1,800,000 (mostly electric and steam industrial or narrow-gauge locomotives); East Germany, also about £1,800,000 (mainly hopper wagons); Hungary, £1,460,000; and Yugoslavia, about £1,000,000 (coaching stock and refrigerator vans for high-speed traffic). Other purchasers were Czechoslovakia, Bulgaria, Rumania, North Korea and Albania to complete the communist countries. No exports to the Western group or its sympathisers are mentioned in the official Polish list.

### Success in fare reduction

AT A time when there are many projects for raising railway fares and charges, not only in this country but in many parts of the world, and when there is equal argument as to the benefits which might accrue from a reduction in charges, it is worthwhile noting the results of action in this field in Australia. The decision of the Victorian Railways Commissioners to reduce fares on two lines under their control by approximately 25 per cent is claimed to have produced a remarkable increase in the number of passengers travelling. On one of the lines, in the short period November, 1960, to April, 1961, passengers travelling were reported to have almost doubled. So successful has been the experiment on both the lines in question that there is now a movement for it to be extended to others. The lines on which action has been taken are each about 40-miles long and radiate from Melbourne.

### Danish summer railway timetable

AMONG changes offered this summer by the Danish railway timetable are two new Saturday expresses from Copenhagen to Jutland, connecting with Great Belt ferries. The first, leaving Copenhagen Central at 11.20, is overtaken by the Copenhagen-Esbjerg diesel train "Engländeren" on the way to Korsør. Here, the diesel train enters the ferryboat while passengers from the Saturday Special are allowed 1 min. to change from train to boat, a good example of the close



timings which the Danish State Railways seem able to keep. In the opposite direction, a new train leaves Jutland on Sunday night, arriving in Copenhagen at 6.27 on Monday morning.

### British participation in 1962 C.I.M.A.C.

THE British National Committee of the International Congress on Combustion Engines (C.I.M.A.C.) has begun its work of organising U.K. participation in the Sixth International Congress scheduled to take place in Copenhagen between June 18 and June 23, 1962. During the year ended March 31, 1961, the Secretariat has covered two meetings of the Permanent Committee—at Paris and Gothenburg respectively—and, with the help of the Committee's technical representatives, three meetings of C.I.M.A.C. technical sub-committees in Paris, Brussels, and Gothenburg. The Secretariat has also been engaged in co-ordinating and arranging for the submission of synopses of papers for the technical proceedings at Copenhagen. Twelve U.K. synopses have been sent forward. It seems probable that the U.K. will repeat the substantial contribution it made to the proceedings at Wiesbaden in 1959.

### Tallyllyn Railway progress

REHABILITATION by a preservation society of a railway of scenic or historic interest has ceased to be a novelty, but the only line to have completed a decade of operation under such auspices is the seven-mile Tallyllyn Railway of 2-ft. 3-in. gauge in Wales. It was built in 1865 to serve a slate quarry and to carry passengers. The quarry closed in 1947 but passenger traffic continued until 1950. The railway was then in a deplorable condition, and was due to be scrapped. A preservation society was formed in October, 1950, since when an exacting standard of engineering efficiency has been set, and an excellent publicity campaign carried out. The summer service began on May 20, and was launched with a well-illustrated and revised official guide, price 1s., and additions to the series of plain and coloured postcards.

### Ore handling at Port Elizabeth

THE South African Railways & Harbours administration has placed an order valued at nearly £722,000 for the purchase and erection of an ore-handling plant to be installed at Port Elizabeth. The equipment is being manufactured entirely in South Africa and will cost £632,400 approximately; installation is estimated at £89,600. The plant is designed to unload wagons at the rate of £1,500 tons an hour, two dumpers being provided for this purpose. They will discharge on conveyor belts carrying the ore to a stock-pile store holding 184,000 tons. From the store a single belt will be used at first—but may subsequently be duplicated if necessary—to carry the ore when required for shipment, to an elevated gallery 600 ft. long parallel to a berthing quay. Two loaders, movable along the quay, will be provided, each capable of handling 750 tons of ore an hour. The berth is being built to accommodate 45,000-ton ore-carriers.

### Planned development on Indian Railways

Now that Indian Railways has completed its second five-year plan period—it ended on March 31, 1961—it is possible to record a few of its achievements. The construction target of 800 miles of new line has been exceeded and 800 miles of line have been doubled, a further 500 miles being well in hand. Several new marshalling yards to serve steel plants and coal mines have absorbed another 200 miles of track. Great bridges over the Ganges and Gandak have been completed and that over the Brahmaputra is well on the way to completion. Some 2,100 locomotives, 8,500 coaches and 100,000 wagons have been added to the stock during the period. About 500 miles of line have been electrified and progress is continuing.

The allocation for the third five-year plan period, 1961–66, totals slightly over £941 million, and is based on an expected increase in traffic from 54,000 to 93,000 million ton-miles. Acquisition of about 1,700 locomotives, 7,800 coaching vehicles, and 110,000 wagons is envisaged.

### Motive power in the U.S.A.

AT THE end of 1960, the Class I railways in the U.S.A. owned only 232 steam locomotives, and almost all of these were either stored or unserviceable. Fifteen years earlier the steam stock totalled 38,853 of the 43,530 locomotive units and, even at the end of 1949, coal-burning and oil-burning steam locomotives (then numbering 28,964) accounted for 71 per cent of both locomotive units and also of total tractive effort. During the past 15 years, the total of electric locomotives has also declined, although not nearly so drastically. Nevertheless, the total of 842 units in 1945 is now reduced to 494, and electric locomotives provide only 2 per cent of the gross tractive effort. In this period of 15 years the diesel-electric locomotive has grown from 3,816 units to 28,369. The latter figure compares with the grand total of 29,143 locomotive units of all types, giving the diesel-electric more than 97 per cent. The balance is represented by 48 turbo-electric units.

### Potters Bar tunnels

ONE of the most important construction undertakings on British Railways in recent years was the quadrupling of the New Barnet-Potters Bar section of the East Coast main line of Eastern Region. The major works involved in this widening were the constructions of three new double-line tunnels. Their unusual design and the methods employed in these tunnels were described in an article in our issue of February 14, 1958, but, thanks to a paper recently presented to the Institution of Civil Engineers by Mr. A. K. Terris and Mr. H. D. Morgan, further details of the conditions faced, reasons for the design, and additional works are now available.

The three original tunnels duplicated by the new ones each contained an Up and a Down line but, to conform to the four-track arrangements obtaining on both sides of the tunnels, both Down lines are now accommodated in the new tunnels and the Up lines in the old tunnels. As Down trains are ascending a long 1-in-200 gradient through the new tunnels, the latter are specially subject to the maximum exhaust of steam locomotives and fumes from diesels, a major consideration in the choice of a material for the lining.

Although the concrete-block type of lining previously described is the most suitable for circular tunnels in solid London clay—where the ground loads transmitted to the lining tend to become uniform around the tunnel ring—and therefore for the central portions of the Potters Bar tunnels, it is unsuitable for the end portions near the portals. There, the depth of cover is not great and the clay is subjected to release of overburden, causing its swelling and softening. A lining comprising units not capable of developing tension at the joints can withstand only a limited eccentricity of loading. Accordingly, the end portions of the tunnels were built in cast-iron rings, necessary in any case near the portals at the beginning of each shield drive. To prevent deterioration in the cast-iron sections and to secure an inner surface in line with that of the central-portion concrete lining, the bosoms of the cast-iron lining were filled with *in situ* Sealithor cement concrete.

Experience with cast-iron tunnel segments and similar flanged concrete segments had shown that in the case of the latter, due to incorrect placing of the key segments, compression was virtually concentrating in the skin. Investigation therefore aimed at the use of a plain shell that could be expanded into the surrounding ground and so make it unnecessary to grout the annulus between the lining and the hole cut by the shield. Hence the adoption for Potters Bar tunnels of a reinforced concrete lining of plain segments in rings prestressed



to the ground as cut by the shield. Each ring was put in compression by jacks subsequently replaced by *in situ* concrete as previously explained. This design proved extremely economical, saving both the much-greater cost of cast-iron and the grouting necessary in previous orthodox tunnelling.

The invert units are of rapid-hardening Portland cement, but the remaining units and the *in situ* lining covering the cast-iron segments are made in metallurgical supersulphated cement and granulated blast-furnace slag of low-heat variety and highly-resistant to sulphuric-acid attack caused by locomotive exhaust. It is also resistant to diesel gases. The exhaust will, moreover, dissolve the lime liberated by the hydration of Portland cement. On the other hand, metallurgical supersulphated cement liberates little lime and contains an excess of silica as compared with the elements combining during hydration. This excess covers the various hydrated constituents and, because it is insoluble in the acid, protects them. Because of its low lime content the hydrated calcium compound is attacked and dissolved, liberating silica which will form a protection against further action of the acid. In most unfavourable conditions this cement has shown no deterioration even after eight years, and has fully justified its use in tunnels.

To ensure the essential accuracy of the concrete blocks and their interchangeability, they were cast in part-aluminium, part-steel moulds, accurately machined to  $\pm 0.01$  in.; all units were made in a factory at site. Weigh-batched mixes were electrically controlled from a console, and the resulting volumes accurately calibrated to provide the precise quantity required to fill the mould of the particular mark or type of *voussoir*-block being cast. Consolidation was effected with two poker vibrators suspended above the point of filling, the concrete being very carefully compacted. Curing was done with steam-heating in winter. Compaction-factor and cube-crushing tests were made regularly, and in addition, ultrasonic testing of the blocks was carried out at two points, the second in the stacking yard. Calibration charts for each type of mix enabled the actual compressive strength of any block to be assessed from the readings of the ultrasonic pulse times.

For refuges and throats for air-shafts necessitating openings in the tunnel lining, special techniques were devised. These allowed the tunnel at these points to be built in individual rings, at first self-supporting but subsequently part-supported by adjacent rings to permit of the removal of blocks to form the required openings. The system of concrete lining adopted prevented the air shafts from being broken into the crown of the tunnel. Instead, they were led off at the horizontal diameter, and blocks near the jacks were subsequently removed to form the openings. There are two ventilating shafts in Potters Bar tunnel and a third throat, as above, is provided in case an extra shaft is found necessary.

### Even-interval timetable for Western Region

IN the summer of 1924 the former Great Western Railway brought into operation the first systematic British main-line timetable, which set out not only even-interval departures from Paddington down all its various main lines, but also even-interval departures from some provincial centres to London. The aim was not merely to give an improved service to passengers, but also to obtain increased mileages from locomotives, rolling-stock, and staff during each working day. While in general the pattern of this timetable has remained without much alteration during the intervening years, there have been changes in the scheduled departures of certain trains, and new services such as the "Bristolian" and the Bristol and Birmingham Pullmans. The Western Region has now decided to operate a completely systematic plan, and on September 11 next is introducing a remodelled timetable involving revolutionary alterations to certain trains.

The greatest changes will be on the West of England main line. Departures from Paddington are to be at 2-hr. intervals from 8.30 a.m. to 6.30 p.m., and in the Up direction from

Plymouth every 2 hr. from 6.30 a.m. to 4.30 p.m. Each of these trains is to carry a through portion for Torquay and Paignton; this means that the historic non-stop run of the "Cornish Riviera Express" is to be abandoned, and in future this express is to call in each direction at Taunton and Exeter, and take 15 min. longer to and from Plymouth—4½ hr. down and 4 hr. 25 min. up. Similarly, the "Torbay Express," calling additionally at Reading, Westbury, Taunton, and Newton Abbot, is to have a through portion to and from Plymouth and Penzance. Except between October 30 and April 14, there will be an additional express from Paddington at 11.30 a.m. to Torquay and Plymouth, non-stop to Newton Abbot and taking 4 hr. 5 min. to Plymouth; it will return from Plymouth at the same time and be due in Paddington at 3.41 p.m.

Altered departures of note from Paddington will be the 60 min. earlier of the existing 9.30 a.m. Down, the 60 min. later of the long-established 1.30 and 3.30 p.m. Down, and the 40 min. later of the existing 6.30 p.m. Down. The name "Royal Duchy" is to be transferred to the 8.30 a.m. from Paddington, which will run through to Penzance, and to the 11.30 a.m. (present 11.5 a.m.) Up; the 4.30 p.m. down, terminating at Truro, will be the "Mayflower," returning from Truro at 6.30 a.m., and from Plymouth as now at 8.30 a.m. The first departure from Plymouth, at 6.30 instead of 7.15 a.m., will give business executives and others a chance of reaching London at 11.15 a.m. instead of 12.10 p.m., and will equally benefit Torquay, Exeter, and Taunton. While the quickest journey between Paddington and Torquay will take 11 min. longer Down and 10 min. longer Up than now, average journey times will be reduced by 13 min. Down and 25 min. Up.

From Paddington to Bristol the departure times will be at 45 min. past each hr., from 7.45 a.m. to 7.45 p.m. inclusive, and in the reverse direction from Bristol at 15 min. past each hr. from 7.15 a.m. to 6.15 p.m., also at 7.45 p.m. No Bristol train in future will use the Badminton line, and every express will call at Bath. The 105-min. non-stop run of the "Bristolian" is therefore to be abandoned, and no less than 14 min. will be added to this schedule to allow for the Bath stop. The midday "Bristol Pullman" times are to be altered to 12.45 p.m. from Paddington and 3.15 p.m. from Bristol, on a 2-hr. schedule including both Bath and Chippenham stops; the morning Up Pullman will start 30 min. later, at 8.15 a.m. from Bristol, and the Down evening working will be at 5.45 instead of 4.55 p.m., on a schedule of 115 min.

Fast new workings will be the 10.45 a.m. and 4.45 p.m. from Paddington, both non-stop over the 94 miles to Chippenham in 90 min. The long-continued fast midday run Up from Bristol will be missed; the 12.15 p.m. Up is to take 2 hr. 21 min., and the 1.15 p.m. 2½ hr. The name "Merchant Venturer" no longer will be carried by any train on this service. The principal beneficiaries on both this and the West of England main lines will be intermediate towns such as Didcot, Chippenham, and Westbury, which will have a number of additional stops, and to avoid as far as possible any undue lengthening of overall times, there will be many fast point-to-point runs booked at over 60 m.p.h. from start to stop.

The South Wales main line is already so well patterned in the matter of even-interval departures that it has needed less in the matter of change. Here, the outstanding alteration is that of the "South Wales Pullman," on which a diesel Pullman set is to be substituted for the present steam-hauled working, and at entirely different times. The present Down morning and Up evening workings are to be reversed, with the train starting its day at Swansea at 6.40 a.m. and leaving Cardiff at 7.50 a.m., with a timing of 127 min. over the 133.6 miles from Newport to Paddington; the 3 hr. 35 min. from Swansea and 2 hr. 25 min. from Cardiff, to reach London by 10.15 a.m., are the fastest Up times on record. Going Down, the Pullman will take the 4.55 p.m. departure, with 127 min. allowed to Newport, 2 hr. 25 min. to Cardiff and 3¼ hr. to Swansea. The 8.55 a.m. Down will lose its Reading stop, and be non-stop

to Newport, but the 11.55 a.m. will call additionally at Reading, and the 3.55 p.m. at Didcot.

Coming Up, the 6.25 a.m. (now 6.30 a.m.) from Swansea will be passed at Cardiff by the "South Wales Pullman," leaving there as now at 8 a.m. and calling additionally at Badminton, Swindon, and Didcot, for a London arrival at 11.10 a.m. The name "Capitals United Express" is to be transferred to the 8.55 a.m. from Paddington and the 1.30 p.m. back from Swansea. As now, South Wales departures from Paddington will be at 55 min. past the hr. from 7.55 a.m. to 8.55 p.m. (except at 9.55 a.m., 12.55 and 7.55 p.m.), and Up from Cardiff at the even hr. from 8 a.m. to 7 p.m. (except 11 a.m., 1, 2 and 6 p.m.).

The fewest changes of any will be seen in the Birmingham service. Here also the midday Pullman workings are to be altered; the Down "Birmingham Pullman" will start at 10.10 a.m. instead of 12.10 p.m., and will return at 1 p.m. instead of 2.30 p.m. The "Inter-City" express will leave Paddington at 8.20 instead of 9 a.m., and there will be a 9 a.m. departure on Mondays only. The "Cambrian Coast Express" Down working will be at 11.10 instead of 10.10 a.m., and the former will no longer run to Birkenhead, though the 12.10, 1.10 and 2.10 p.m. all will do so, the first and third of these non-stop from Paddington to Birmingham. Worcester line trains in future will leave Paddington at even 2-hr. intervals from 9.15 a.m. to 7.15 p.m. inclusive, and, in the Up direction from Worcester, from 9.10 a.m. to 7.10 p.m., also at 7.25 a.m., and from Oxford from 10.33 a.m. to 8.33 p.m. and at 8.48 a.m.

While, as previously mentioned, various intermediate towns benefit by more and faster trains, this is less the case with the larger cities. On the other hand many intermediate towns which have undergone considerable development in recent years, are better served. The review in general has been made with the object of providing a service which, overall, will be better planned and will produce improved financial results. Moreover, it is intended that basically the timetable should be unchanged throughout the year.

### Swiss summer train services

THE most outstanding additions to the Swiss summer timetable are the new T.E.E. trains, the first in Europe to have electric rather than diesel-electric traction and able to work at will with 1,500 and 3,000-V d.c. or 15,000 and 25,000-V a.c. current. The 8-hr. Paris-Milan service is to be known as "Cisalpin"; it will leave Paris at 1.15 p.m. and run 5 min. behind the "Mistral" to Dijon, after which the only stops will be Vallorbe, Lausanne, Brigue, and Domodossola, all of 2 min. duration. Between Lausanne, left at 6 p.m., and Brigue the time for the 90½ miles will be 82 min. eastbound and 84 min. westbound, despite numerous speed restrictions. Eastbound, the Milan start will be at 2.55 p.m. and the Lausanne stop will be at 6.9/6.11 p.m., giving a good connection to Geneva (arriving 7.11 p.m.) and from Geneva (at 5.9 p.m.). From Brigue also a Lötschberg connection will make possible a Milan-Berne journey in 4 hr. 3 min., the fastest of the day.

The other T.E.E. trains are those which will provide 4-hr. morning and evening services between Zurich and Milan. The only intermediate stop will be Lugano, and the passage of both Bellinzona and the frontier station at Chiasso without stopping is unprecedented. The "Gottardo" will leave Zurich at 8.45 a.m. and return from Milan at 5.5 p.m., while the "Ticino" will start from Milan at 8.20 a.m. and return from Zurich at 12.40 p.m., after a turn-round time of 20 min. These Swiss T.E.E. trains will not begin operation until July 1.

The summer service in general, will start as in other Continental countries on May 28. Another development of note is that the "Riviera Express," carrying the through coaches and sleeping cars from Grossenbrode and Amsterdam to Ventimiglia, will run direct from the Badischer station at Basle without entering the Swiss station, using the recently-constructed spur from the German station to Muttentz, and then

travelling via the east curve at Olten, Aarau, Wohlen, and Rotkreuz to Immensee and Arth-Goldau. Leaving Cologne at 8 p.m. as now, this train will be accelerated 16 min. to reach Basle at 1.39 a.m.; starting from there at 2.10 a.m., 65 min. before its present departure from the Swiss station, it will reach Milan at 8 a.m., 47 min. earlier, in exactly 12 hr. from Cologne.

The "Italia Express," with portions from Calais, Ostend, Copenhagen, Amsterdam, and Berlin to Rome, will follow from Basle at its present time of 2.51 a.m., and the summer relief from Basle, with portions from Calais and Ostend to Milan only, whose times southward will be assumed by the "Riviera Express," will take the former's time out of Basle, starting at 3.15 a.m. All these three trains, avoiding reversal at Lucerne by taking the Rotkreuz route, have no advertised stop between Basle and Bellinzona, though they will actually stop at Erstfeld to change crews. The same procedure is to be adopted in the northbound direction; the Milan to Calais and Ostend relief will start first instead of last of the trio, at 9.48 p.m., the "Italia Express" following at its present 10.17 p.m., and the "Riviera Express" coming last at 10.34 p.m., and running direct to the Badischer Station at Basle, with an acceleration of 51 min. to Cologne.

The through night service from the Hook of Holland to the Riviera is to be diverted from the Gotthard line to an unusual route. Leaving Basle at 6.14 instead of 6.25 a.m., it will run to Berne (the sleeping car will be extended from Basle to Berne) and from there via the Lötschberg line to Brigue and on through Domodossola to Arona. From here, it will travel south through Arona, Novara, and Alessandria to Genoa, an entirely new route for an international service, arriving at 3.17 p.m. The same route will be used in the opposite direction, at 2.26 p.m. from Genoa, stopping at Berne from 9.39 to 9.57 p.m., and reaching Basle at 11.38 p.m.

### Rehabilitation of Argentine Railways

AFTER full and detailed investigations, the Argentine Government has compiled its comprehensive "emergency plan" for the rehabilitation of rail, road and river transport. The total railways cost involved is 25,000 million pesos spread over a period of 10 years. This sum is distributed as follows:—

Way and works	Cost millions of pesos
Reconstruction of 2,600 km. of track	11,000
Rolling stock	
Purchase of 100 shunting and 10 main-line diesel units	1,430
Purchase of 150 electric suburban and 300 main-line coaches	5,440
Rebuilding 200 coaches and repairs to 600	4,030
Rebuilding 3,200 and general repairs to 4,800 wagons	2,100
Supplementary carriage and wagon repairs	1,000
Other items	25,000

The Government submitted this plan to three firms of consulting engineers recommended by the World Bank, namely: Netherlands Engineering Consultants, Coverdale & Colpitts, and Renardet. Their preliminary report is outlined below. They consider that the total expenditure is justified, but call attention to the excessive age of much of the rolling stock, and its inferior maintenance. They, therefore, recommend that the purchase of the locomotives be made, provided that they are of 750 or greater h.p., and that they are capable of a speed of 90 k. p. h.; also that they can be used singly or in multiple unit. They consider that diesel-hydraulic locomotives should not be purchased.

The rebuilding of the 3,200 old wagons is not recommended, but the general repairs of the 4,800 is approved, provided that their age is not over 30 years and other conditions are fulfilled. They also consider that 6,000 new wagons should be acquired at a cost of about 6,000 million pesos. The whole of the coaching-stock programme is approved except that the 600 vehicles to be repaired must be capable of lasting at least another 10 years.

The urgent need for reconditioning 1,747 km. of track is

stressed at a cost of 4,200 million pesos. The re-signalling of a number of areas and the provision of level-crossing barriers should take priority. Improved access to the City of Rosario and a new goods yard there should be given priority. In fact, the remainder of the report recommends the relative priorities of all items.

### Scottish Region summer services

BY far the most revolutionary changes in the summer timetable of the Scottish Region of British Railways are those to be effected north of Aberdeen and Inverness. The patronage extended to the 2½-hr. diesel multiple-unit trains between Aberdeen and Inverness has been sufficient to warrant the doubling of their number during the summer. Instead of 8.45 a.m. and 5.30 p.m., these trains will leave Aberdeen at 7.50 and 11.45 a.m., 1.50 and 6.0 p.m., and eastbound, instead of 8.30 a.m. and 5.15 p.m. from Inverness, times will be 8.30 and 10.45 a.m., 2.30 and 5.30 p.m. In addition to Keith Junction, Elgin, Forres, and Nairn, the 7.50 a.m. and 1.50 p.m. westbound and 10.45 a.m. and 5.30 p.m. from Inverness will stop at Huntly without increase in overall journey time. The remaining trains on this service will be diesel-hauled, with slight accelerations, though the 2.10 (now 2.15) and 3.55 (now 3.45) p.m. from Aberdeen will be 16 and 17 min. quicker to Elgin respectively. Decision on these changes was reached too late for inclusion in the timetable book, and is being published in separate leaflets.

Between Inverness, Wick, and Thurso substantial cuts in time were made in the 1960-61 winter timetable, and this summer is to witness an even greater speed-up, partly resulting from the closing of further intermediate stations. In the 57½ miles between Inverness and Bonar Bridge, only Dingwall, Invergordon, Fearn, and Tain will remain open. Compared with last summer, the 6.40 a.m. from Inverness will reach Thurso at 11.37 a.m. and Wick at 11.40 a.m., instead of 12.55 and 12.46; the 10.40 a.m. will start at 11.25 a.m. but be in Thurso at 4.5 instead of 4.35 and Wick at 4.5 instead of 4.44 p.m.; while the 4.15 p.m. will start 30 min. later and reach Thurso 52 min. earlier, at 9.59 p.m., and Wick 53 min. earlier, at 10.1 p.m. There will be a new 9.30 a.m. from Inverness, due in Thurso at 1.47 and Wick at 1.50 p.m.—by far the fastest time ever recorded over this route. This means an average reduction in the length of the northbound journey by no less than 83 min. in a single year.

Coming south the gain will be less, but the former 8.35 a.m. from Wick will start at 9.25 a.m. and reach Inverness at 2.44 p.m., 4 min. later; the 9.45 a.m. will start at 12.40 p.m. and arrive at 5.7 instead of 2.50 p.m.; and the 3.35 p.m. will start at 5.0 and arrive at 9.58 instead of 9.27 p.m.; the average gain will be 46 min. In addition to its higher speed (which will permit more round trips for motive power between Inverness and Wick), the service will be far better distributed through the day than formerly, and will give improved connections at Inverness. There will be some deceleration of northbound trains on the West Highland Line, though, rather curiously, a corresponding acceleration of the southbound services.

As an addition to Scottish observation car facilities, the 9.15 a.m. (10.30 a.m. up to June 30) from Inverness to Kyle of Lochalsh is to include both an observation car and a buffet car, returning at 5.30 p.m. Other addition to refreshment service will result in the provision of restaurant, buffet or miniature buffet cars on all but one of the even-interval express departures from Glasgow to Aberdeen and Dundee from 7.15 a.m. to 5.30 p.m., and correspondingly in the reverse direction; and miniature buffets will be added to certain other trains also.

On the Carlisle-Glasgow main line *via* Carstairs, the Down "Royal Scot" and "Caledonian" will be restored to 7-hr. schedules from London to Glasgow; the former will leave Euston 10 min. later, at 9.15 a.m., and the latter 20 min. later, at 3.55 p.m. The "Royal Scot" will call at Carlisle throughout the summer and be accelerated 28 min.; the "Caledonian" acceleration will be 25 min. The "Midday Scot," at 1 p.m.

instead of 12.50 from Euston, will continue to reach Glasgow at 8.35 p.m. Last summer's fast working from Carlisle of the 9.50 a.m. (now to be 10 a.m.) from Euston to Perth, calling only at Motherwell, Larbert, and Stirling, will not be repeated; the train will continue to run as now, arriving in Perth at 7.40 p.m. The 1.5 p.m. from Euston to Perth will start 15 min. later, and instead of dividing at Carlisle will run forward as a single train, reaching Perth 5 min. earlier, at 12.25 a.m. The 9.35 p.m. all-sleeping car express from Euston will start 10 min. later and arrive in Glasgow at 6.30 a.m., 10 min. earlier.

Southbound, the "Royal Scot" and the "Caledonian" will take 7 hr. 5 min. from Glasgow to Euston, and as usual in summer the former will not pick up passengers at Carlisle. The 12.15 p.m. from Perth to Euston will start 5 min. later and reach Euston 9 min. earlier, at 9.56 p.m.; while the 9 a.m. from Perth will be 21 min. earlier into Euston, at 7.40 p.m. Like the 10 a.m. from Euston, it is to include miniature buffet facilities as well as a restaurant car; the same provision is made already on the "Royal Scot" and the "Thames-Clyde Express." On the East Coast main line, as mentioned in the review of the North Eastern Region timetable in our April 7 issue, arrival in Edinburgh of most of the expresses from Kings Cross will be from 9 to 11 min. earlier, while the 7.30 p.m. Down "Aberdonian" will be 52 min. earlier into Aberdeen, at 6.27 a.m.

The full electric Glasgow suburban service is included in the timetable book, but with a note that it will recommence at a date to be announced, and that meantime a separate leaflet gives details of the substitute steam service.

### Ineffective railway motor power

BY A CORRESPONDENT

SINCE 1958 there has been an alarming increase in the number of railway locomotives of all types taken out of traffic for repairs either in workshops or at motive power depots. The ratio of unserviceable locomotives to total stock used to be about 15 per cent. At the end of 1959 the percentage rose to 17.5 and in March, 1960, to 19.7. No. 3 *Transport Statistics* reports 3,019 locomotives as out of action on March 26, 1961. That is not far short of a fifth of the net operating stock of 15,104, an extraordinary result at a time when many old steam engines were scrapped and replaced by new diesel or electric locomotives.

It is to be hoped that the setback in the efficiency of motive power is already the subject of a special enquiry. Of a net operating stock of 12,290 steam engines, 2,582, or 21 per cent, were unfit. The under repair ratio for diesel, mechanical and hydraulic locomotives was 14, though 215 of the stock of 622 were added during the previous twelve months. Over the same period 478 diesel-electric locomotives raised the stock to 2,060, with 307, or 15 per cent, useless. The climax was reached with electric locomotives, which numbered 85 in December, 1959, with eight out of order. By March, 1960, ten of a stock of 91 were under repair. In the next 12 months, 49 more machines went into stock, only to have 40 laid aside for repairs out of a stock of 140. To have 28 per cent of any variety of motive power inactive sounds like a rake's progress!

For passenger train services the reliability of both diesel and electric multiple-unit carriages has retrograded. In 1959 the percentage of diesel units under repair was 9.5; it fell to 8.5 in March, 1960, to rise to 10.1 this year when 398 of a stock of 3,913 vehicles were not available. The proportion of electric multiple-units laid aside was larger. In 1959 it was 7.3 per cent, rising to 7.7 in March, 1960, and to 10.2 per cent this year, when 586 of 5,718 units were out of service. From time to time we hear reports of large travel increases on lines where diesel services are run, but statistics for two months to February show an all-line decrease of 925,000 journeys spread over all areas except the Southern and Eastern, which serve suburban and outer-suburban areas from London terminals by interval electric schedules.



## LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

### EDWARD PICKERING, CONTRACTOR

May 1

SIR, Information is sought concerning Edward Pickering, contractor to the Cape Town & Wellington Railway.

Pickering arrived in this country either late in 1858 or early in the following year, having had experience in railway construction in England and possibly also on the continent of Europe. It is believed that subsequently he left South Africa and returned to Europe. Any details of his career including particulars of lines he built in England would be much appreciated either through your columns or direct to me at this address.

It is hoped to publish in due course a short history of the Cape Western System, the earliest section of which celebrates its centenary next year.

Yours faithfully,

V. STEWART HARAM

"Edenfield," Stellenberg Avenue,  
Kenilworth, Cape, S.A.

### RAILWAYS INTO ROADS

May 23

SIR, In your issue of May 12, "Benbow" points out that 95 per cent of railway freight tonnage originates in private sidings, but he does not explain that this custom grew from the former practice of the private wagon. This was of great advantage to the owner in that he could plan his loading or unloading to suit his own convenience, independently of the arrival or departure of a train of 50 or more wagons, and it was economic to maintain a pool which could be used for storage, then moved by hand as required. It is significant that the brakes of the typical British railway wagon were designed to be operated by a man standing on the ground.

In surveying the modern scene it is interesting to note that, in spite of the abolition of the private wagon on the main running lines at the time of nationalisation and the growth of road haulage, the convenience of the railway wagon on the private siding is still significant. The road lorry is an expensive machine with its own engine and driver so that to minimise standing time, loading and unloading has to be conducted expeditiously, this being an appreciable factor in the reputation of road transport for alleged cheapness. On the other hand, railway wagons are still used, not only for the conveyance of bulk commodities, but for their storage until required. By these means the saving in handling costs more than offsets demurrage charges. This may be a great advantage to the customer, but for the railway the average wagon turn-round of nine days wreaks havoc with the finances.

A further point of interest is that the use of the rail wagon as a storage box on wheels is of such economic value that many large concerns possess their own private railway systems, in spite of the fact that their own long-distance haulage may be by road. It would be a disaster for industry if the advantages of the rail wagon were to be lost by this proposed conversion, and a much more logical step would appear to be the transfer of more traffic from road to rail, so as to give a transit from private siding to private siding, in rail wagons all the way.

Arguing in more general terms, the rail vehicle lends itself very conveniently to remote control, and there are many installations, collieries, docks, steelworks and the like, where wagons are handled by gravity, capstans and hawsers, and so

on. In the most modern systems one man can handle large numbers a day from a control tower, including emptying each wagon into a hopper.

With the modern trend toward ever-higher wages, industry is continually seeking means for obtaining greater output per man-hour, and this pressure is likely to be intensified in the future, not only by higher wage costs, but by ever-increasing difficulty in obtaining labour. The answer to such problems will lie in the ability to apply techniques whereby one man can do the work previously done by hundreds, and in the field of transport the logical device is the railway, which enables a high output per man-hour in conveyance and handling to be realised.

Yours faithfully,

A. W. T. DANIEL

3, Hall Way,  
Purley, Surrey

### HIGH-VOLTAGE LOCOMOTIVES

May 15

SIR, While some of Mr. B. Steiner's comments about a.c. locomotives are correct, some need to be challenged.

I refer to his table in the issue of February 17, in which the Swiss locomotives 5,525 h.p. (1-hr.) rating is compared with 3,220 h.p. for the British Railways a.c. locomotives. This makes it appear that the British locomotive is an inferior design. It is left to the reader to infer that the 3,220 (British) h.p. is in fact the continuous rating. Furthermore, it may not be generally known that formulae used on the Continent for calculating rated h.p. are different from the British formula. Unless the Swiss locomotive h.p. has been calculated by a formula identical to the British formula, its value is likely to be inflated for several reasons.

If, for instance, the English Electric British Railways locomotives are considered, the weight is 73 tons and the rating 2,950 h.p. continuous (British formula) or 4,040 h.p. 1-hr. in accordance with the I.E.C. Rules No. 48-1955. A power greatly in excess of 4,040 h.p. calculated by formulae used on the Continent could be obtained if 7 tons of electrical equipment were added thereby increasing the weight to that of the Swiss locomotives (80 tons). The locomotive is designed to meet the service requirements which do not require more power. It must be remembered that higher power and light-weight are not obtained free of charge and have to be justified both technically and economically. It is not a question of technical competence but of engineering economics (witness the high price of the Swiss locomotives quoted in your February 10 issue).

Yours faithfully,

E. A. K. JARVIS, B.Sc., A.M.I.E.E.

3, Rockwood Crescent, Woodhall Park,  
Pudsey, Yorkshire

### RAILWAY SUPERANNUITANTS

May 25

SIR, With reference to the Editor's article on page 556 of *The Railway Gazette* dated May 19 respecting railway superannuitants.

Although in the old days it was obvious that anyone in "excepted employment" who would receive a superannuation allowance on retirement would be debarred from receiving



the then Old Age Pension of 10s. per week at 65 years of age, I do not think you have quoted the full facts.

The Government made it possible about 1926 for any person in "excepted employment" to become a voluntary contributor to a supplementary pension scheme. The offer was only for a very limited period.

I purchased an insurance stamp each week and affixed it to an insurance card. The completed cards were handed every six or twelve months to an approved friendly society (in my case, the National Deposit F.S.). I continued this from 1926 until the 1947 National Insurance Act became operative.

When, in 1953, I retired from the London Midland Region, formerly L.M.S., I was thus assured of the Old Age Pension at 65 years of age.

I am afraid many members of the staff failed to grasp the opportunity placed before them in 1926, so to some extent it is their own fault that they were unable to receive the Old Age Pension.

Yours faithfully,

H. SMITH

97, Bushey Mill Crescent,  
Watford, Herts.

[As our correspondent has stated the offer to become a voluntary contributor was open only for a limited period and, while those who were far-sighted enough to take advantage of it ultimately gained, it does not materially alter the argument contained in our editorial.—ED., R.G.]

#### BRITISH RAILWAYS DIESEL TRACTION

May 25

SIR, From the report which appears in your issue of May 19, 1961, covering Mr. E. S. Cox's paper read in South Africa, it appears that this gentleman has now lost touch with reality to an extent that must seem absolutely incredible, even to the most uncritical advocates of diesel traction.

On what premises does he base his engine and locomotive lives at 20 and 40 years respectively? I doubt whether there is a 40-year old diesel locomotive in the world to back up that statement. British Railways' large-scale experience of main-line diesel locomotives amounts to only two or three years, but dieselised America shows that about 15 years of life is all that can be expected of a diesel locomotive.

Mr. Cox claims that diesels are justified by their running economies, but fails to balance these against the capital charges involved. I would suggest that he dare not do so, for fear of exploding the myth which he has helped to build regarding diesel traction.

The only tangible result of the wholesale dieselisation of B.R. passenger services seems to be a general increase in passenger fares and it becomes increasingly obvious that, until the event of electrification, which is undoubtedly the best form of rail traction, then the modern steam locomotives offer far better value for money than the diesels can ever hope to achieve.

I challenge Mr. Cox to prove his statements.

Yours faithfully,

A. E. DURRANT

7, Spencer Road,  
Chiswick, London, W.4

#### RUBBER SUSPENSION

May 25

SIR, You recently published an interesting article in two parts entitled "Obtaining a smooth-running bogie." The author referred to all-rubber suspension "being often proposed for main-line work without appreciation of the widely different conditions." He then criticised certain features of rubber springs in comparison with steel coil springs.

As the only main-line carriage to go into service with all-rubber suspension is fitted with springs designed and supplied by Metalastik Limited, we believe our comments on the points raised by the author will be of interest.

##### *Insufficient longitudinal rigidity*

The Metalastik bolster springs do not require to be fitted with "the usual bolster guidance system." Records show an almost complete absence of longitudinal vibration at all speeds. The static vertical deflection of the car springs is 5½ in. Bulkier and heavier than equivalent coil springs

Apart from the fundamental fact that rubber has a greater strain energy capacity than steel per unit of weight, the rubber springs as designed by Metalastik not only replace the steel springs, but much of the ironmongery, too. This is well shown in the accompanying illustrations which depict the bolster springs as supplied for a B.R. standard bogie (right), and the replaced steel parts excluding the outer bolsters (below). The net saving in weight per unit of weight, the rubber springs as designed by Metalastik not only replace the steel springs, but much of the ironmongery, too. This is well shown in the accompanying illustrations which depict the bolster springs as supplied for a B.R. standard bogie (right), and the replaced steel parts excluding the outer bolsters (below). The net saving in weight per bogie is over 18 cwt., which also includes the saving in weight of the axlebox suspension.

##### *Cost more*

Considering the bogie as a whole, that fitted with Metalastik suspension would cost less—and have no wearing parts.

##### *Shorter life*

The original bolster springs, fitted experimentally by London Transport nearly 14 years ago, are still in service. They have the same stiffness rate as when new and they appear to be good for many more years.

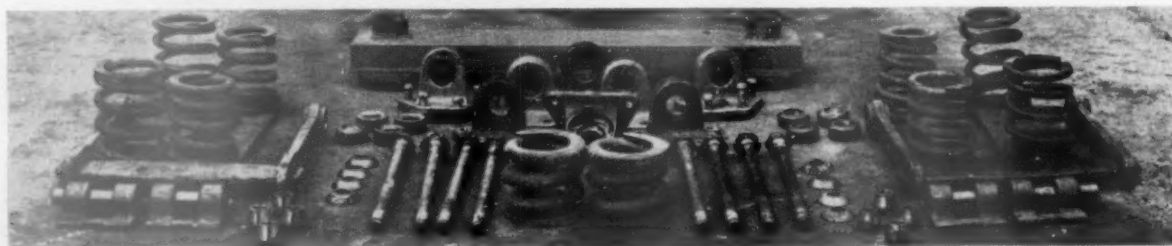
You will appreciate, therefore, that we are unable to agree with the author that, except for stops, bushes, pads, etc., "there appears to be little use for rubber" in a main-line bogie.

As a matter for further interest, the Midland Red Motorway Express, coaches, which compete for speed and comfort with the London Midland Region of British Railways, are fitted with Metalastik all-rubber suspension.

Yours faithfully,

F. E. SHEPPARD,  
Group Sales Manager (Railways)  
Metalastik Limited

Evington Valley Road,  
Leicester



# The Scrap Heap

## Not known

A letter addressed simply to: "The New Chief of British Railways, London—Personal and Confidential" was delivered with no delay to Great Northern House in Kings Cross.

## Stiff upper lip, too?

The British Railways (W.R.) Staff Association Band of Swindon won Third Prize in the Second Section contest of the *Daily Herald* Open Brass Band Festival at the Dome, Brighton, last Saturday week (May 20). The conductor, Mr. Cyril Winstone, wore a plaster jacket—he had recently received hospital treatment for a slipped disc.

## Ambition fulfilled at cost?

A man was remanded in custody for eight days at Wolverhampton on May 15. He was charged with mounting a railway locomotive steam engine and causing it to travel from Stafford Road sheds, Wolverhampton, endangering the safety of persons on the railway on January 24. He was further charged with stealing 4 cwt. 56 lb. of coal belonging to the British Transport Commission, and failing to comply with the requirements of a probation order made at Wolverhampton Quarter Sessions last year.

## Debentures for traffic losses?

During 1960, the first year of operation, receipts from the sale of tickets by the Metropolitan de Lisboa, the Lisbon underground railway, fell short of operating expenses by Esc. 14·8m. (about £186,000). Another series of debentures with a nominal value of Esc. 60m. is to be issued. There have been six previous issues, with a total nominal value of Esc. 305m. The Metropolitan de Lisboa is an electrically-operated underground railway, 8½ miles long, which was opened on December 29, 1959.

## London's "Elevated Electric"

The new system of electric trains from Victoria and Clapham Junction to the Crystal Palace, which the London & Brighton Company hope to open to the public on May 12, when the Festival of Empire commences, was tested today (May 2). The electrification of the line from London Bridge to the palace is almost completed.—From "The Evening News," May, 1911.

[The electrified line between Victoria and the Crystal Palace (10 miles 14 ch.) was brought into use on May 12, 1911, and coincided with the visit of King George V to the Crystal Palace to open

the Festival of Empire, held to celebrate his coronation year, but full electric service was not inaugurated until June 1. The London Bridge to Crystal Palace service was not opened until 1912.—Ed., R.G.]

## Country style

A correspondent writing in *The Times* recently described the difficulties he encountered at a rural station when arranging for the conveyance of a perambulator to a town 10 miles down the line. He located "Fred," the only member of staff on duty, doing some weeding in a bed of hollyhocks. Fred had had experience of bikes and carrier-pigeons, but a perambulator, unaccompanied, was an unprecedented event, though he was able to quote "free and a tanner" for pram and passenger together. At this client's suggestion he then

weighed it as a parcel. It came to 15s., which was clearly too much. After searching in a drawer, which yielded much irrelevant material including an M. & G.N. timetable, Fred despaired of solving the problem unaided, and 'phoned a mate in a signalbox. According to this oracle, the charge was 7s. 6d., 4s. more than if the pram were accompanied. Fred suggested sending it by bus.

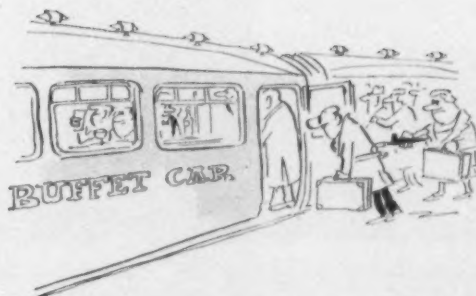
## Got their numbers

Three schoolboys on a Whitsun train-spotting expedition were robbed at gun-point by five "dead-end" kids, one of whom produced an air pistol. The schoolboys put up a fight—but were forced to hand over their money. The young bandits kept 10s. and gave back 3s. to each schoolboy for his fare home.



## BUFFET CAR

by Larry



[Reproduced by permission of "Punch"]

# OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

## ISRAEL

### Railways turn loss into profit

Israel Railways is reported to have shown a surplus of about £150,000 for the 1960-61 financial year, after having operated at a deficit of £11 million the previous year. The southern line to Beersheba has proved more profitable than expected, and this has given fresh impetus to the scheme for extending the link as far as Eilat, which had been shelved. Offers received from foreign concerns to help build the line (including a 25-yr. credit for materials and rolling-stock) are under consideration.

## EAST AFRICA

### New line in Tanganyika

Approval in principle has been accorded to the building of a 227-mile railway in Tanganyika, from Mikumi to Makumbako through the Kilombero Valley. The Tanganyika Government and East African Railways & Harbours are negotiating for an early beginning of the first 24 miles to serve a new sugar factory.

### The Whitson Report

Sessional Paper No. 6 of 1961, "Proposals for the Implementation of the Recommendations of the Whitson Report," on the state of industrial rela-

tions on the East African Railways & Harbours, was tabled at the meetings of the Central Legislative Assembly which began on April 26. The Acting Commissioner for Transport, Sir James Farquharson moved its adoption on May 1. The Sessional Paper is brief and needs no reference to any particular feature or summary of its contents at this stage.

### £1,500,000 appropriation for re-laying

Expenditure of £3 million on major works has been approved by the East African Transport Advisory Council. Half will go on the re-laying of track on the Tanga, Mwanza and Magadi branches to allow the use of heavier locomotives.

## SUDAN

### Preparations for constructing new dam

At a recent meeting between the Director of the Sudanese Ministry of Agriculture, Irrigation & Hydro-Electric Power, the General Manager of Sudan Railways, railways and irrigation officials, representatives of Torno Company and other contractors, it was agreed that the Sudan Railway would offer every facility for transporting the required materials and equipment from Port Sudan to the site of the Khashm El Girba Dam. The Sudan Railway administration is now starting work on the extension of the railway from Atbara to

the dam zone. The meeting also discussed the transport of materials for the preparatory work now in progress at Roseires.

## SOUTH AFRICA

### New locomotives and stock

The Railways placed in service 19 Class 5E1 electric and 13 diesel-electric Class 32 locomotives during the last quarter of 1960. The electrics were built by Associated Electric Industries in the United Kingdom, and the diesels were supplied by the International General Electric Company of the U.S.A. In addition 61 new coaches and 1,505 new wagons (including 47 tank-wagons) appeared in traffic; 15 coaches and 822 wagons were withdrawn from service during that quarter.

## HUNGARY

### Progress of long-welded rail laying

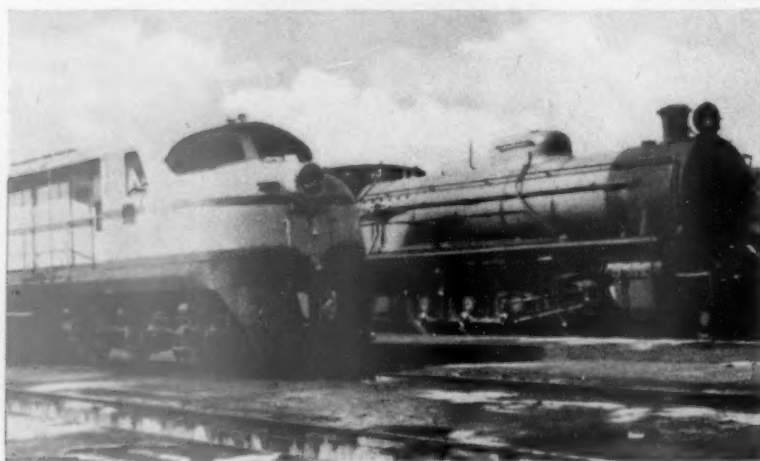
Hungary is making steady progress with the introduction of continuous welded rail track. Continuous rails are in use on 620 miles of the national network and will be extended to three times that distance by 1965. It is being found that the welded track not only has improved life but that maintenance costs are cut by as much as 50 per cent. By the end of this year the Budapest line running south and south-west to the Yugoslav frontier will be relaid as far as Dombóvár.

## NEW ZEALAND

### Wagon shortage due to strike

There have recently been extraordinary seasonal demands on the rolling stock of the New Zealand Government Railways, the carriage of fruit, frozen meat and timber being the main contributing factors to an acute shortage of wagons and vans. This shortage has in particular affected the carrying of coal from the North Island mines at Huntley. Probably the greatest single factor in the rolling stock shortage has been a shipping congestion at the Port of Auckland as a result of the tally-clerks' strike in London. When the wharf sheds at Auckland became congested, railway wagons became storage sheds for several firms. Railway workshops have been working at pressure to complete wagon orders on hand, and it is expected that the backlog will shortly be overtaken.

## GHANA MOTIVE POWER



Ghana Railway & Harbours new "1401" class diesel-electric locomotive with a "248" class (oil-fired) steam locomotive



## NEW SOUTH WALES

### Sleepers for Pakistan

At the port of Eden, on the south coast of New South Wales, 15,000 tons of railway sleepers are being shipped to Pakistan in the polar ship *Thala Dan*, returning to Copenhagen from her Australian Antarctic charter. The present shipment is the first for two years and is believed to be a trial. It is hoped that it will revive the sleeper-cutting industry and that if successful it will be followed by further Pakistani orders including one for a similar quantity of sleepers this year.

## SOUTH AUSTRALIA

### Pick-a-back in South Australia

The Adelaide Steamship Company has announced the start of a road-rail pick-a-back freight service between Port Adelaide and Port Lincoln.

## VICTORIA

### Diesel-electric locomotives

Sir Arthur Warner, Victorian Minister of Transport, recently announced that the 26 1,500-h.p. "B" Class diesel-electric locomotives delivered to the Government Railways, during 1952-53, had run an aggregate mileage of about 27 million miles. Twelve units had each exceeded a million miles, one having covered 1,370,000 miles. Eleven others had each run over 900,000 miles and the remaining three about 850,000 miles. The average weekly mileage ranges from 2,000 to 2,500.

Other classes of diesels in service are:

"S" Class (1,800 h.p.)—14 of these are in service and delivery of another is expected shortly. The "T" Class 900-h.p. locomotives are chiefly used for general-purposes and branch-line service—they total 37. There are 25 "W" Class 650-h.p. diesel-hydraulic units; the "S" and "T" Classes have electric transmissions.

## PAKISTAN

### U.S. loan for diesels

The Government of the United States has announced a \$6½ million loan to Pakistan to buy railway equipment for the North Western Railway. The loan is the third under the Development Loan Fund to Pakistan railways, and will be used to procure 23 broad-gauge diesel-electric locomotives and other equipment. The North Western Railway, in addition to existing traffic, will be handling an increasing volume of freight haulage over the next 10 years in connection with the work on the Indus Basin Development project. By 1962 the traffic is expected to reach nearly two million tons a year.

## INDIA

### Head-on collision at Telta, N.E.F.R.

An accident occurred in the early hours on March 8 at Telta station on the Kishanganj-Katihar section of the North-east Frontier Railway when Amingaon-Maniharighat passenger train No. 24 Down, collided head-on with a goods train standing at Telta station. Two vehicles of the passenger train were

telescoped, and five wagons of the goods train were derailed. 11 persons were killed and 39 injured.

### New lines under construction

In February, 1960, work began on the construction of a new 107-mile line in Assam from Rangapara North to North Lakhimpur. It runs in an easterly direction between the Brahmaputra River and the foothills of the Himalayas. The first 12 miles to the Jia Bhareli River were completed in December, 1960, allowing materials for the bridge over that river to be railed to site. Since February, 1961, other construction materials have been able to cross the bridge on a temporary one.

### Extension to tap Tripura

Another short construction is as an extension of the Karimganj-Kalkalighat branch to Dharamnagar. Though only 10½ miles long, the new extension will connect Tripura State with Assam generally.

## CANADA

### New station and offices at Moncton

Associated with the recently-completed C.N.R. marshalling yard at Moncton, New Brunswick, a 10-acre area is to be developed as a combined six-storey headquarters office building, passenger station, shopping centre, restaurants, car park for 1,400 cars, and recreational amenities. Work was begun in May and is estimated to take just over a year. The marshalling yard was described in *The Railway Gazette* of February 24 this year.

## PUBLICATIONS RECEIVED

*Electric Furnaces for all Industries.* This leaflet, issued by Metalelectric Furnaces Limited, Cornwall Road, Smethwick, illustrates a selection of electric furnaces suitable for a wide range of industrial processes. These include furnaces for stress-relieving of transformer stampings and laminations, annealing copper wire, melting various types of steel and iron, and a variety of heat treatment and hardening processes.

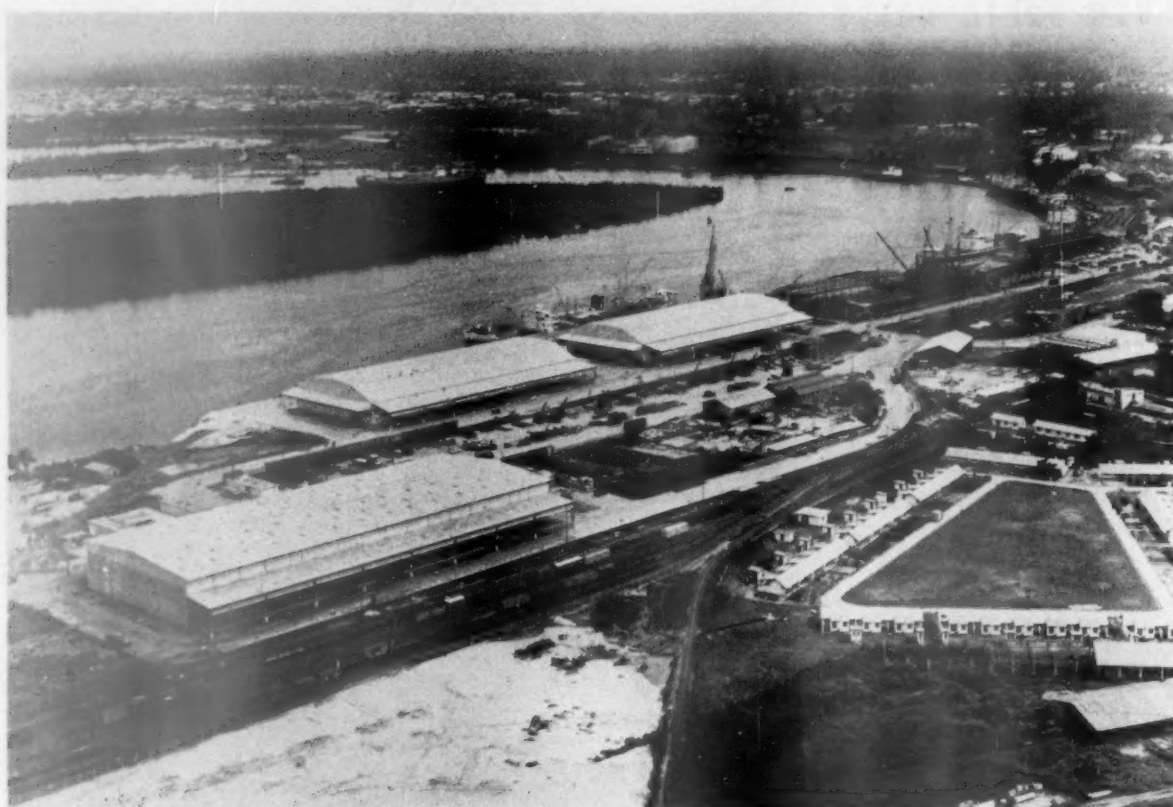
*Metal Industry Handbook and Directory,* 1961. 50th year of publication. London: Iliffe Books Limited, Dorset House, Stamford Street, S.E.1. 8½ in. x 6 in. 560 pp. Price 21s. (22s. 9d. by post). This publication is a standard work of reference containing comprehensive information in connection with the non-ferrous metal industries. Up-to-date particulars of the properties of some of the newer as well as the more familiar

metals are given in the first section, which also includes summaries of British Standard, Admiralty, and other specifications. Section II contains general data and tables, while Section III is devoted to electroplating and allied processes. The directory occupies the fourth section, which lists a wide range of producers, stockists, and factors of all basic metal products, metal working machinery, and metal finishing equipment, as well as giving particulars of the associations, societies, and institutions connected with the metal and allied trades.

*J.W.P. Service Tools.* The 1961 edition of the Pickavant catalogue, issued by J. W. Pickavant & Co. Ltd., Alkaway Works, Bow Street, Birmingham 1, contains details of a wide range of service tools suitable for the motor trade and other industrial applications. New items

introduced in this edition include a spot-weld remover set, a valve lifter, and a radiator pressure cap and cooling system tester.

*North Eastern Electrics.* By K. Hoole, Lingfield, The Oakwood Press. 8 in. x 5½ in. 58 pp. Illustrated. Paper covers. Price 8s. 6d. This booklet is No. 15 in the series of Locomotion Papers on the history of transport. The subject is one of considerable interest, for much pioneering work on electrification was done by the North Eastern Railway. Full particulars are given of the stock, and there are many illustrations of the various forms of vehicles in use. Some of these, such as the de-icing vans and perambulator vans, are not well known; the latter are unique in this country. The information, largely based on official records, is well presented, and the booklet forms a useful source of reference.



*General layout of extensions, showing marshalling sidings in foreground*

## SIDINGS FOR PORT HARCOURT, Nigerian Railway

DUE to the development of Nigeria and the expansion of its export trade, capacity of ports had to be increased to ensure quick handling of shipping and cargoes. Some years ago, the Port of Apapa, Lagos, was considerably extended but the need then arose to increase the facilities at Port Harcourt, the principal port of Eastern Nigeria.

New marshalling sidings were the primary need, but in the design stages the opportunity was taken to improve the method of marshalling by introducing new inlet and outlet sidings to the Nigerian Railway main line. It was also necessary to provide sidings on the wharf front, together with wide-gauge crane tracks, for the ready handling of goods in and out of the new transit sheds and wharf storage buildings.

The contract for all sidings was entrusted to Thomas Summerson & Sons Limited, of Darlington, whose surveyors visited the site in 1955.

The main inlet and outlet 3-ft. 6-in. gauge tracks, reception sidings, and

marshalling sidings, together with auxiliary sidings serving the bonded warehouses and workshops, were supplied in 60 lb. FB.BS. revised section rails, laid on local-grown timber sleepers, on stone ballast quarried locally. The tracks are laid on cast-iron canted bearing plates and the rails are fastened by four elastic rail spikes per sleeper.

### Concrete roadways

A proportion of these tracks is located in, or crossed by, concrete roadways; at these positions the tracks are fitted with check rails, held by cast-iron distance blocks and bolts, and gauge tiebars. In such situations the sleepers, canted plates and spikes were omitted, the tracks being laid on 8 in. thick concrete rafts; the concrete road surface is level with the top of rail.

**New inlet and outlet sidings and wide-gauge crane tracks help toward easy handling of goods**

The turnouts in the reception and marshalling sidings were made from 60 lb. FB. rail, to an angle of 1 in 8 with a radius of 448 ft. The switches are of the heel type 12 ft. long, with cast-steel heel blocks; these are bolted to the switch tongue and stock rails and pivot with the switches. The slide-chairs are built up from a steel sliding plate with a pressed tee-bar jaw riveted on and bolted to the switch stock rail web. Three gauge-tieplates are fitted beneath the switches, at the points, and immediately in front of and behind the heel of the switch. The switch heel block is suspended between the latter two tieplates.

Behind the switch heel where there was insufficient distance to accommodate cast-iron commonplates, steel back-heel plates were fitted, with cast-iron distance block. These are held to the rails by steel

clips and bolts with "Evertite" patent lock nuts. All the switch and back heel plates are secured to the crossing timbers by  $\frac{3}{4}$  in. dia. galvanised coachscrews. The switch connecting rods are of spring steel flat bars on edge, with brackets and bolts to fit the tongue rail.

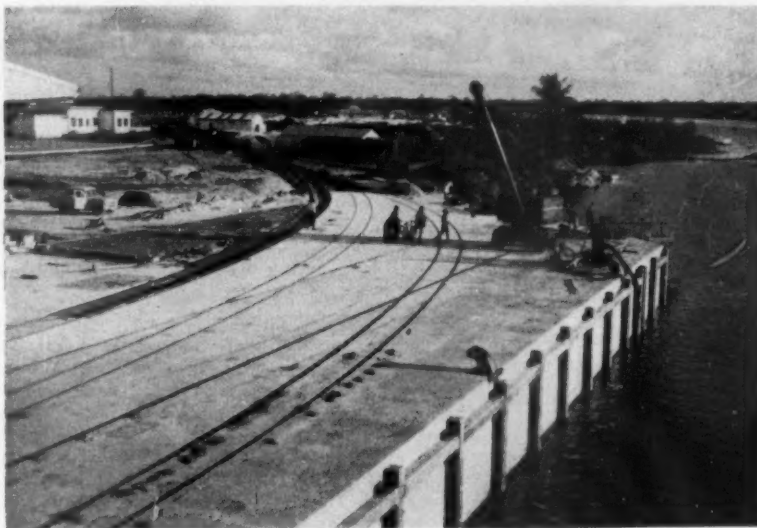
The switches are operated by Summerson's "David" pattern all-steel lever boxes, provided with a shearing pin and locking device. This need is peculiar to local conditions.

#### Crossing details

The crossings have an angle of 1 in 8 and the splice rail is housed in a notched point rail, the crossing nose being cut back to form a saddle in front of the nose to accommodate a fang bolt fastening, which is fitted through the full depth of the crossing timber with a rectangular fang nut on the underside.

The check rails are at least 9 ft. long and fitted with four cast-iron check blocks and bolts per rail. Both the crossing and check rails are seated on flat, mild-steel bearing plates  $\frac{3}{4}$  in. thick, held to the rail flanges by clips and bolts. The fixing to the crossing timbers is by four galvanised coachscrews per plate.

The intermediate crossing timbers between the switch heel and the front of the crossing, spaced at approximately 2-ft. 6-in. centres, are fitted with cast-iron bearing plates of the Nigerian Railway's pattern and are held to the timbers by galvanised elastic steel rail spikes.



*Extreme south end of wharf, showing wagon and crane tracks sunk flush in concrete and emerging on ballast formation*

Where turnouts occur in roadways, or flush-paved areas, these are fully guarded throughout with 60 lb. rails and are laid on reinforced concrete rafts, packed to line and level, and paved with concrete to top rail level. In such applications the switch tongue rails are planed to a special size, to reduce the travel and gap to a minimum, thus lowering the risk of vehicular or pedestrian traffic becoming

trapped. The tongue rail webs are reinforced both laterally and vertically by having flat steel reinforcing bars riveted to the rail web over the entire length.

The switches are operated by Summerson's flush two-way lever boxes, presenting no obstruction to traffic.

The guarded crossings were made to the same angle as the unguarded crossings and planed in an identical manner, but are fitted with a railguard vee. The rails were riveted to flat mild steel bearing plates  $\frac{3}{4}$  in. thick, which are held to the concrete foundation by  $\frac{3}{4}$  in. dia. indented foundation bolts.

The intermediate track rails between the switch and the crossings are fitted with guard rails, cast-iron distance blocks and bolts, and 1 in. dia. gauge tie-rods. No holding down fastenings were necessary as the surface concrete gives sufficient anchorage.

Several of the 1 in 8 unguarded turnouts, which occurred just clear of the roadways, were laid on concrete rafts. These turnouts were made to the same specification as the turnouts laid on sleepers and timbers except that sleepers and timbers, cast iron bearing plates, and spikes were omitted and the rails were drilled in the flange for indented foundation bolts at approx. 3 ft. centres.

#### Reinforcements of crossways

Angular crossways are fitted with steel riveted fishplate reinforcement to all notches in rails and bent corner fishplates were fitted to all corner joints. The corner chairs are of fabricated steel with steel flange clips and bolts for holding down purposes.

All the tracks, turnouts, crossovers, diamonds, and crane crossings on the wharf were made from 80 lb. FB.BS revised section rails, guarded by 5 in. x 3 in. bulb angles, for laying flush in



*View of wharf front showing sidings, lever boxes, and crane tracks sunk flush with wharf*



concrete. Straight track is fitted with 5 in. x 3 in. bulb angle to each rail, to form a chase kerb for the wheel flange. The bulb angles have cast-iron distance blocks and bolts at approximately 3 ft. centres with  $\frac{7}{8}$  in. dia. gauge tie-rods substituted for the distance bolts at every third position. Curved track is to the same specification, except that a check rail is fitted to the low side of the curve, instead of bulb angle, to reduce the risk of wheel flanges rubbing against the guard and wearing it away quickly.

#### Guarding of turnouts

The turnouts on the wharf front were all supplied fully guarded, suitable for laying on concrete rafts and are concrete filled to the top rail. The specification is generally the same as that of turnouts in roadways or paved areas off the wharf, with the following modifications. The rails are 80 lb. FB.BS. R. The leads of the turnouts are guarded by 5 in. x 3 in. bulb angle, instead of rail, except opposite the crossing on the straight track, and continuously round the low side curved rail, where 80 lb. check rails are fitted. The guard, or check vee, of the crossings, which were made to an angle of 1 in 8, are manufactured from bulb angle.

The crane track, which runs along the greater portion of the wharf, is of 15 ft. gauge. The rails are of the duplex type to suit crane wheels with centre flanges.

Each rail consists of two parallel 80 lb. rails, at 5 in. centres, held together and apart by cast-iron distance blocks at approximately 3 ft. centres. The rails are riveted through the flange to a 14 in. x  $\frac{1}{2}$  in. continuous longitudinal baseplate, held to the concrete crane beams by indented foundation bolts at about 2 ft. 6 in. centres.

As the holes in the beam were precast the design involved accurately fixing about 1,200 bolt holes in the longitudinal plates in order that bolt-holes lined up with the bolt-holes in the beams. These crane tracks are intersected by the 3 ft. 6 in. gauge wagon tracks in a number of places, involving the provision of suitable crane crossings, which were required to carry single-flanged wheels on one track and centre-flanged wheels on the other. Here also the holding down bolts were required to align with preformed holes in the concrete crane beam.

#### Extent of installation

In all, 11,900 yd. of track, 88 turnouts, five crossways, and seven diamond crossings were installed, together with 310 yd. of transporter track, 990 yd. of duplex crane rail, and 22 crane crossings. The supply and installation was spread over three years.

The site problems encountered during the site installation were many and varied, including the procuring and train-

ing of local native labour as platelayers acting under British supervisors.

The main fan of the marshalling sidings was sited on land reclaimed from swamp, and it was necessary to effect some means of stabilisation. This was achieved by laying a mattress of brushwood in three layers—the middle layer being laid crosswise to the lower and upper layers—the bundles of brushwood being fastened at intervals of 1 ft. The middle layer had the sticks interwoven. Sand was laid on the mattress until sinkage ceased. This mattress extended over an area of about 300,000 sq. ft.

#### Inclined connection

As the Nigerian Railway sidings were considerably higher than the port area and there was only one track for both incoming and outgoing traffic, it was necessary to construct an additional track, which involved making a cutting about  $\frac{1}{2}$  mile long to produce a reasonable incline up which the locomotives could haul their loads.

The concrete wharf extension was carried on piled foundations driven into the bed of the River Bonny.

Consulting engineers for the project were Messrs. Coode & Partners. The main contractor was Taylor Woodrow (Nigeria) Limited, and the permanent way contractor was Thomas Summerson & Sons Limited.

## TRAIN INDICATORS at Harlow Town

TRAIN indicators of a new design—the first of their kind in this country—have been installed at Harlow Town Station on the Cambridge main line of the Eastern Region of British Railways. Both platforms at this station have been equipped with easily-legible indicators, which are double-sided and electrically-operated.

#### Remote control

Each indicator is remotely controlled from a panel immediately below the face. This incorporates a number of four-position rotary switches, each controlling one indicator display level. A master switch enables 13 pre-set items of train information to be given.

The information is displayed on three-sided drums rotated through a common gear train driven from two electric motors. The motors run under the control of the switch settings until all

First of a new design, double-sided and electrically-operated, shows 13 items of train information



One of the indicators being operated by a member of the staff

the three-sided drums have rotated to the required position. They are subsequently locked by an electro-mechanical plunger.

The information is illuminated by eight fluorescent tubes, and an illuminated directional arrow indicates to which side of the platform the departure refers.

The indicators were developed, supplied, and installed by Setright Registers Limited.

#### CHANGE OF ADDRESS FOR LOCOMOTIVES

As from Tuesday, June 6, the registered office of the Institution of Locomotive Engineers will be situated at Locomotive House, 30, Buckingham Gate, London, S.W.1. The new telephone number will be Victoria 7838.



*Interior of Witham Signalbox, showing use of Stelvetite between window cills and floor*

## A VERSATILE MATERIAL of interest to railway engineers

INTERESTING railway applications have been made in London and Leighton Buzzard recently of Stelvetite, a plastic-coated steel. It has been used to line the tunnel of the 312-ft. moving way between Waterloo and the Bank—the Travolator—and, in a smaller but no less interesting application, has been applied to the roof of a railway subway. Here, at Leighton Buzzard, complaints had been received regarding condensation which had caused moisture to drop on users from the roof. This had been formed by 10-ton slabs of concrete reinforced with old railway lines and moulded with 10 tons of concrete. The complaints ceased after the roof had been re-made, using Stelvetite at the bottom of the mould with its plastic surface outward: rail sections were placed to reinforce the metal side, concrete was poured on, and the whole was left for a fortnight.

### Use in signalbox

The first illustration to this article shows how Stelvetite has been used in a signalbox in the Eastern Region of British Railways. This Region reports its experience of the material as follows:—

"With the increasing use of new materials in buildings and, in particular, modern plastic coverings, a recent develop-

**Plastic-coated steel offering strength, high degree of resistance to weather and chemicals, and good insulating properties**

ment in heating equipment is the use of plastic-faced radiant heating panels in conjunction with low-pressure hot-water central heating schemes.

### Painting unnecessary

"Where previously Solray radiant panels were only supplied with a mild-steel surface and painted in position, the advent of a plastic finish makes this unnecessary. Further advantages are that the surface is permanent, washable, and obtainable with a number of simulated surfaces, such as leather, Rexine, etc. Colour-matching has also been facilitated. This plastic surface in this respect is as suitable as vitreous enamelling, but will not chip.

"The loss in emission from the plastic surface is very small and amounts to only 5 per cent—at the same time it gives no discomfort from accidental contact with the bare skin.

"The plastic-faced panels are not as easily adaptable as the standard panels on account of the plastic skin which cannot withstand the heat of welding and

also needs careful handling during manufacture. Because of the special heat/pressure process with which the plastic skin is applied to the plates, it is not possible to apply this after manufacture, and the normal spot-welding process used in the construction of standard Solray panels is not possible. Special resistance stud-welding to rear of plate carried out with electronic welding machines to localise the weld heat to prevent damage to the plastic face is necessary."

This material so far has been used in the Eastern Region of British Railways for the signalbox at Witham and also in the signalbox under construction at Colchester.

### Other applications

Other applications of possible transport interest are: lift linings; end-walls of buildings, and hard-wearing surfaces—as is shown in the illustration of a tea-trolley which is reproduced on the next page.

Stelvetite combines the strength, rigidity, and ductility of steel with the

warmth and colours of vinyl. It is available in a variety of embossings and prints. Its reverse side is electro-zinc plated or hot-dip galvanised.

The sheet can be sheared, punched, formed, seamed, deep-drawn, and expanded without damage to the coating and without divorcement of the vinyl from the steel base. It offers a finished material, ready for fabrication: pre-treatment, painting, and stoving are unnecessary, and the finish is permanent.

It can be produced in an unlimited range of colours, and any colour can be matched. Ten light-fast shades have been chosen as standard. These are: grey; cream; lagoon (a blue-green); canary; pale blue; black; cherry red; white; light grey, and light green. These colours are available in the standard morocco embossing. Other embossings are available. By a special process, prints can be made almost indestructible.

#### Manufacturing limits

The sheet normally is sold within minimum and maximum lengths respectively of 48 and 144 in. and minimum and maximum widths respectively of 24 and 48 in. (16 to 24 BG) and 42 in. (25 to 26 BG). Smaller sheets can be supplied by re-shearing standard sizes. Corrugated sheet and other profiles are also available.

Standard sizes of sheets are: length, all gauges—48 in. to 96 in.; width (16 to 24 BG)—36 in., 42 in., and 48 in.; 26 BG—36 in. and 42 in. Price reductions are made for large quantities.

The sheet can be fabricated as sheet metals. Profiles and shapes can be stamped and sections can be made from a coil; if short lengths are required, these can be made on a draw bench.

Most conventional sheet-metal joining techniques are applicable to the mat-

erial, which can be lockseamed, riveted, bolted, and screwed.

In welding, steel to steel or vinyl to vinyl techniques are being increasingly used. A popular method is that of series-resistance projection welding. This employs equipment and techniques designed to limit welding time and preclude overheating and damage of the vinyl film. The method is used for lap welds and attachment of brackets, strips, studs, and nuts and can produce welds of a quality in which the metal will fail before the joint. Conventional methods, can be successfully applied.

The manufacturer can make available a skilled team of development engineers to assist the customer. Illustrated on this page are aspects of the special machinery used by Hirst Electronic Limited of Crawley, Sussex. This company uses a technique similar to that of normal resistance welding. A heavy current is passed through the components in the area where a weld is required. Controlled pressure establishes electrical resistance at the interface, so that heating occurs in a very local area only. When welding Stelvetite, current pulse times must be short because one face of the steel has to be raised to welding temperature while the opposite face must give very short times (1/100-1/50 sec.) and be repetitively accurate.

#### Characteristics

The sheet possesses the following characteristics:—

- (i) It is tough, durable, and hard-wearing;
- (ii) It withstands severe accelerated weathering tests;
- (iii) It is inert to a variety of chemicals;
- (iv) It has a surface of very low flame spread—it has been placed in Class 1 of B.S. 476;



*Trolley with Stelvetite trays*

- (v) It gives good electrical insulation;
- (vi) It is warm to the touch;
- (vii) It is oil- and grease-resistant;
- (viii) It is stable at higher temperatures than those for vinyl alone;
- (ix) It is easily cleaned, with most detergents;
- (x) It is colour-fast.

Strip mild steel is used, cold-reduced to B.S. 1449 En 2A or En 2A/1. Specific gravity of the vinyl is 1.25 to 1.5; tensile strength is 1,500—3,500 lb. per sq. in.; elongation is 100—400 per cent at break.

Routine tests have ensured that (i) a delamination test breaks the vinyl film before breaking the bond; (ii) the laminate bends through 180 deg. without splitting or breaking bond, and (iii) the bond withstands a cupping test. Further tests show that the sheet is suitable for many outside applications.

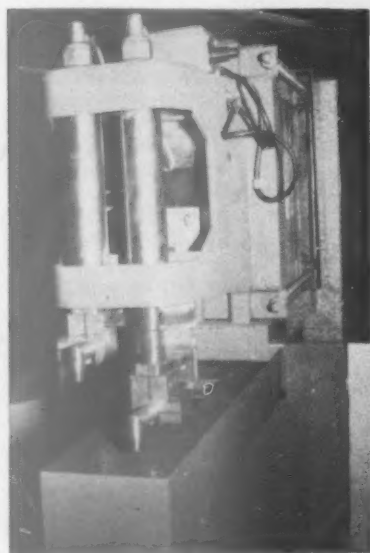
Stelvetite is resistant to acetic acid; vinegar; ammonium hydroxide; bleaching powder; ammonium chloride; potassium dichromate; potassium permanganate; aliphatic oil; ethyl alcohol, and aromatic oil. It reacts unfavourably to strong solutions of sulphuric, hydrochloric, nitric, and glacial acetic acid; to concentrated potassium chlorate, to alcoholic and aqueous iodine solutions; to 50 per cent ethyl alcohol; to alcoholic ammonium sulphide; acetaldehyde; benzene, and carbon tetrachloride.

#### Good resistance of P.V.C.

The p.v.c. coating of the sheet is not attacked by dilute aqueous solutions at room temperature. As the pigment may be slightly discoloured in contact with some acids, the manufacturer should be consulted on colour. A year's immersion in 30 per cent concentrations of most acids shows no attack at room temperature.

Aqueous solutions of caustic soda, caustic potash, and ammonia do not attack the p.v.c. coating, except possibly in high concentrations above 30 deg.C.

Further details can be obtained from John Summers & Son Limited, Hawarden Bridge Steelworks, Shotton, Chester.



*Two views of special equipment used to weld Stelvetite*



# ELECTRIC RAILWAY TRACTION SECTION

## Standards

THIS year's Standards Engineers Conference, held in London during May, was the seventh in the series. As usual it was organised by the British Standards Institution and the Institution of Production Engineers. The opening ceremony was performed by Viscount Hailsham, Lord President of the Council and Minister for Science, who told delegates that an efficient economy requires standards—partly in order to achieve savings by the elimination of unnecessary variety, and partly in order to reduce waste and danger by preventing the production of sub-standard goods. Opinions might differ, said Lord Hailsham, as to how far and in what manner national standards should be compulsory. It was clear that they cannot simply be imposed from without, whether by Government or by any other external force. They must result from discussion between representatives of the producer and the user; there must be a blend of scientific knowledge and industrial and commercial experience, and they must be expressed clearly and intelligibly.

Talking on "Standards and Market Research," Mr. I. Maclean of Hawker Siddeley Industries Limited, made the suggestion that the British Standards Institution could perhaps set up a market-research advisory committee to see whether market research could not in some way be utilised in preparing standards. He went on to express the view that some performance standards were set at an unnecessarily high level, and as an instance of this mentioned transformers, most of which, he said, were only required to operate intermittently for not more than eight to 12 hours a day. But until recently the standard for rating transformers was on a 24-hour basis. The standard, he continued, was much higher in Britain than on the Continent, and was often unnecessarily high in situations where the risk of explosion was almost negligible.

It will be within the experience of most engineers, be they electrical, civil, or mechanical, that what is acceptable in one country will not necessarily pass muster in another. This may evidence itself in various forms. We recall an air receiver, of Continental manufacture, which, while complying with accepted practice in the land of its origin, could not be insured here at the rated working pressure guaranteed to be a safe one by the maker.

The investigations carried out by the Locomotive Manufacturers' Association, when they were preparing their publication on limits and fits, revealed, we believe, some extraordinary situations. An enormous number, probably over 70, tyre profiles were in use in Britain. This is a good example of the need of standardisation. Another very revealing fact which emerged was that the clearance given on a new big-end bearing in one works was sufficient to put the engine into shops on another railway.

The recent sight of some welding, which could be described only as crude, promoted the thought that much work which is done in dressing, fettling, and so on, can have no possible functional advantage, and as such can probably be dispensed with. On the other hand it cannot be denied that a well-finished job may have some psychological value on those charged with its maintenance and operation. Many years ago we visited an engineering exhibition on the Continent, where a large horizontal engine was displayed by a company, the products of which were not normally associated with a high finish. On suggesting that the high finish was far from representative of the standard product, it was explained that experience had shown such a one to be economically justified, on the grounds that those charged with its handling endeavoured to maintain the

pristine condition. Such care in handling benefited both the user and the reputation of the maker.

In these highly-competitive days, when most works managers would contend that costs have been cut to the minimum, there may yet be scope for saving where standards are unnecessarily high. In the past, much money has been wasted by making tolerances too close—slitting saws are examples that occur to us.

It has been said that engineers make bad businessmen, as they are far more concerned with producing a first-class job than they are with the cost of it. There is much truth in this, particularly in the days gone by, when a factor of safety was frequently a factor of ignorance. Today it is possible to predict the performance of most items within very close limits. While it would be a sad day for engineers if design and manufacturing requirements were determined solely by functional requirements, in times of ever-increasing costs re-examination of standard designs, materials, methods and finish, must be constantly borne in mind.

An important requirement is that standards should themselves be more standardised, as between countries. This is already a matter of great importance, and with Common Market developments becomes a matter of necessity. It is certainly one of great moment to the electrical industry.

## New station designs

IN connection with the Liverpool-Crewe electrification, much work is being carried out to improve station facilities.

Completely new stations are being built at Mossley Hill, Allerton, Ditton, Runcorn, Hartford, and Winsford. Considerable alterations are in hand at Edge Hill, West Allerton, and Acton Bridge. Building commenced in the autumn of 1960. The work at Winsford is nearing completion, and it is planned to finish all stations before the end of this summer. It has not been possible to effect completion earlier for a combination of reasons. Bridge raising has been required on a comparatively large scale, there have been delays with sub-contractors, and the government embargo, between June, 1960 and January, 1961, on the placing of new contracts provided a considerable set-back to the completion of the programme.

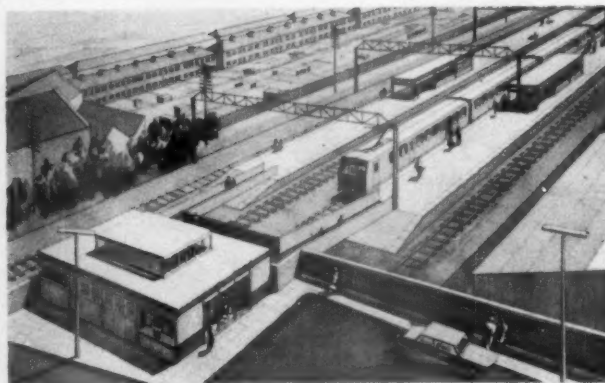
It will be seen from the illustrations, on the following page, that the stations have been designed to modern architectural standards and are also planned to conform to the varying site conditions. Car park accommodation, a requisite of increasing proportions, has been provided at all stations. Other features common to all are large clerestory roof lighting of station buildings, and large areas of glazing. Extensive use has been made of aluminium, together with vitreous enamelled steel for the external walls. This finish has the dual advantages of attractive appearance, combined with minimum maintenance.

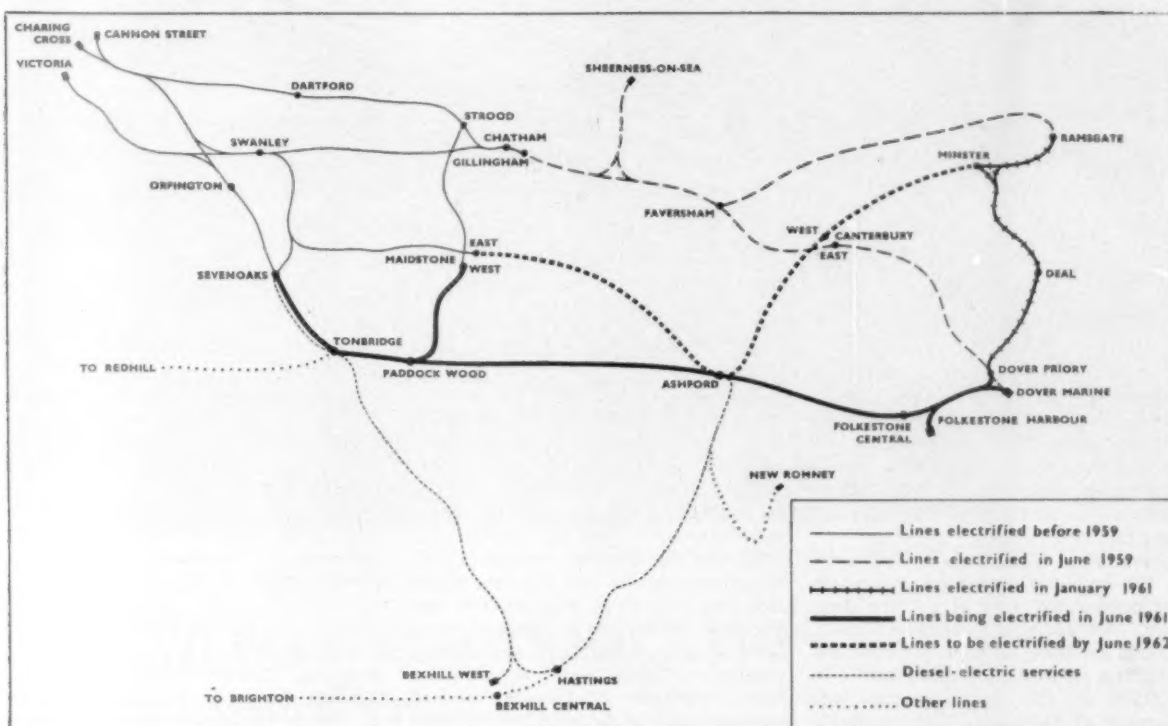
A feature of particular interest is the use of press-button-operated electric heating in the waiting rooms. This operates for 15 minutes before an automatic cut-off comes into operation. Apart from removing a cause of long-standing complaints on the heating of waiting rooms, this method makes a contribution to general cleanliness, which will be a feature of the new stations. Fluorescent lighting is standard. Signs on doors are plastic, and are in the regional colours of red on white.

The station layouts permit of their being efficiently worked with a minimum of staff. These alterations will make a large contribution to the amenities resulting from modernisation of this line. Full electrification of the Liverpool-Crewe line is due to be inaugurated in June, 1962.

*Runcorn Station**Allerton Station*

## STATION RECONSTRUCTION Liverpool-Crewe electric line

*Mossley Hill Station**Ditton Junction Station**Hartford Station*



## KENT COAST ELECTRIFICATION

### Phase 2 progress

NUMEROUS references have appeared in our pages to the second phase of the Kent Coast electrification scheme and readers will be well aware of the large amount of electrical, mechanical, and civil engineering work which is involved, much of which is of a difficult nature. This work has progressed so well that electric working will be introduced on the London-Tonbridge-Ashford-Dover main line and the Paddock Wood-Maidstone West branch line on June 12. This represents an advance of one year upon the time originally fixed for electric working but June 1962 must remain the date when full benefits become available.

#### Work to be done

Much work remains to be done, including installation of colour-light signalling and until such facilities are available it is not possible to introduce faster working. Accordingly at this stage the alteration is a straightforward replacement of existing stock by electric stock. Benefits deriving from this change-over include not only cleaner trains but also increased seating capacity.

The stock to be introduced will be electric multiple-unit sets. A few trains

will remain locomotive-hauled, the locomotives being electric or diesel-electric. The few steam locomotives remaining on the sections concerned will be used mainly on freight trains.

The remaining lines in the second phase of the scheme, from Maidstone East to Ashford and from Ashford to Ramsgate via Canterbury West, will, for the present, be worked by locomotive-hauled trains, diesel-electric locomotives probably being used.

The trains to be introduced this month will be made up from 214 new electric coaches, 180 of which have been built as four-coach corridor express units. These are similar to those already working to Dover and Ramsgate via Chatham. Both new and existing trains will be pooled in service.

Thirty-four of the new coaches are built in two-car sets for intermediate stopping services.

The new coaches replace a similar number of steam-hauled coaches, the

#### Developments enable further electric workings and new stock to be introduced this month

best of which are being transferred to other parts of the Southern Region. The remainder will be withdrawn.

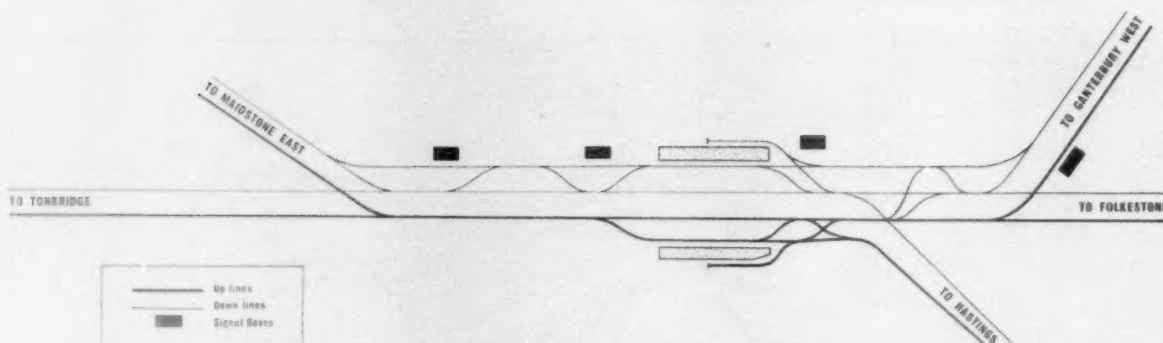
Experience, since the first stock went into service, has led to a number of improvements in the new coaches. In compartment-type coaches the heating system is now controlled by individual switches. The first-class compartments now have adjustable head-rests. Litter bins are provided in the corridors. Mechanically, an important departure is the use of specially-adapted Commonwealth bogies.

In June 1962, when Phase 2 is completed, a further 14 express units and 29 intermediate units will be added.

#### Electric locomotives

The 24 2,500 h.p. electric locomotives required for both phases of the Kent Coast electrification scheme are already in service. More than half of the 98 1,550 h.p. Type 3 diesel-electric locomotives are in use, and new ones are being





Layout of Ashford station before alteration

delivered at an average of one a week. Some diesel-electric locomotives, now working trains of ordinary coaching stock on the main line, will be transferred to main-line freight trains when electric multiple-unit trains are introduced on June 12.

Phase 2 has required the electrification of 132 route miles of track and much civil engineering work of a heavy character. Ashford and Folkestone Central stations are being completely rebuilt, the latter is a particularly difficult job. In addition to the improved passenger amenities at Folkestone both platforms are being lengthened. The additional running lines, provided by the quadrupling between Cheriton and the Dover end of Folkestone Central, will run on the outside edges of the lengthened platforms. The outer roads will come into use later this summer, when the work of raising the inner edge of the up platform to standard height, and building a connecting luggage subway, will commence.

#### Station layouts

At Maidstone East a spare road running through the centre of the station, and used mainly as a siding, is being converted into a reversible line. This will be used as a passing loop by trains running either way.

At Ashford the former layout was barely able to handle the previous traffic on the five converging routes. It would have been unable to cope with the increased service. The new layout will permit of far more trains using the station simultaneously. With the northern platform lines signalled for working in both directions, trains to and from Maidstone East and Canterbury West can use that platform irrespective of their direction of travel. This prevents a considerable number of fouling movements. Trains from Folkestone and Hastings can call simultaneously at the southern platform.

#### Chart Leacon

The new carriage repair shop and inspection shed at Chart Leacon is progressing. In due course trains proceeding to this depot will be able to use the additional up road, leaving the others clear for trains in service.

Most of the track at the junction of the Folkestone, Canterbury West, and Hastings lines has already been taken up and relaid.

The new station at Ashford will have a central booking hall, leading to the two island platforms.

The work in connection with the installation of colour-light signalling is proceeding. This is being put in from Hither Green to Dover, and for a few

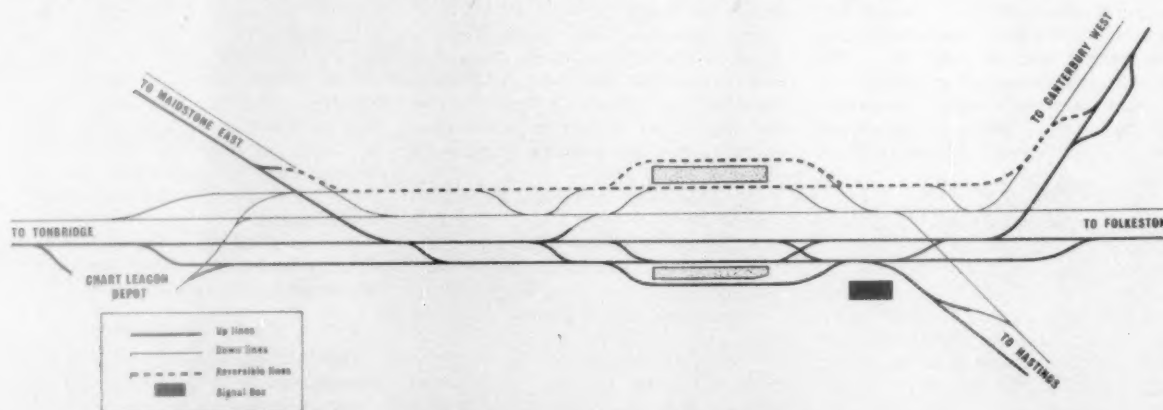
miles along several feeder lines joining the main route. Control will be almost entirely by six new master push-button signalboxes and stretches of automatic signalling.

Thirty-four power sub-stations and 41 track paralleling huts have been built and there is a new electric control room at Paddock Wood.

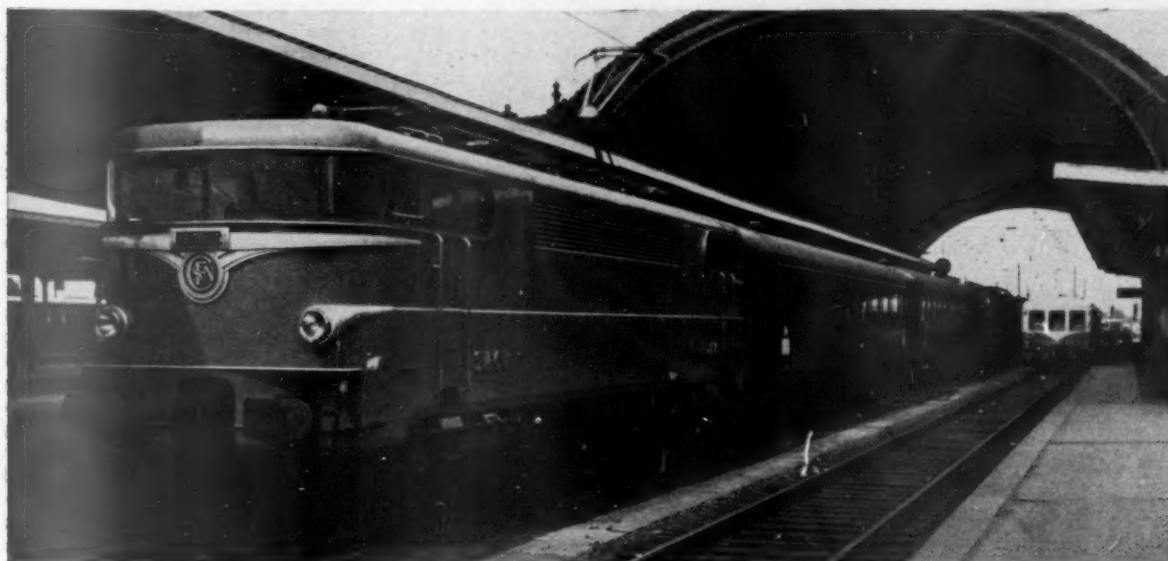
#### Training drivers

In preparation for the change-over more than 70 steam drivers at Tonbridge, Ashford, Ramsgate, Dover, and Battersea sheds have attended three-week courses at the Southern Region's central motive-power training school at Stewart's Lane depot, Battersea. Training here is devoted to theory for the first week, theory and practical work on stock stabled in the depot in the second week, and trial runs on the road during the third week. In addition to these concentrated courses, there is a continuous training programme for electric and diesel-electric locomotive drivers. So far in connection with the Kent coast scheme 380 men have qualified to drive diesel-electric locomotives, and of these 144 are also qualified to handle electric locomotives.

Electric locomotives haul the "Night Ferry" and will soon work the "Golden Arrow."



Layout of Ashford station when alterations are completed



*Silicon-rectifier locomotive on Dunkerque-Basle train at Strasbourg*

## RAILWAY ELECTRIFICATION in Eastern France

It is usual to consider main-line electrification in terms of particular routes, but the present work on the French National Railways between Strasbourg and Paris has to be regarded as part of a wider scheme covering in all some 930 miles of the Région de l'Est.

The original electrification from Valenciennes to Thionville entered the region at Hirson. Subsequent extensions within the region from 1955 to 1957 brought the 25 kV. catenary eventually to Basle. The choice of electric traction for this project was a break with precedent not only in the adoption of the 50-cycle system, but also because heavy freight predominated in the traffic offering. This choice can now be seen to have been justified in the figures of tonnage hauled.

### Freight handling

Comparing 1960 with 1953 (the last year before the early phases of the Valenciennes - Thionville electrification), iron-ore tonnage was 66 per cent higher, and tonnage from the steel industry in Lorraine was up by 76 per cent. The handling of 40 million tons of iron ore in 1960, on steeply-graded lines, would not have been possible but for the Co-Co locomotives of Class "14100," which are allowed to take loads of 3,600 tons over gradients of 1 in 166. By September, 1960, electric traction was for the first time responsible for handling

over half the total goods traffic in the Région de l'Est.

The long trains now being dealt with are making it necessary to lengthen sidings in the marshalling yards at Blainville, Hausbergen (Strasbourg), and Vaire (near Paris). A new yard is to be built at Woippy, near Thionville, in fulfilment of a long-deferred scheme for replacing yards in this area which date from before the 1914-18 war.

### Passenger traffic

Now that the Paris-Strasbourg electrification is complete between Strasbourg and Châlons-sur-Marne (206 miles), passenger services are assuming a new importance in the overall picture. Business travel between Paris and the industrial centres of Eastern France offers the most likely field for development, for, on the international plane, air competition is intense throughout the area. This challenge is felt also in tourist traffic in spite of what has been done already to reduce journey times with electric traction, and in offering facilities such as car-sleeper services. The Ostend-Milan car-sleeper train runs over the main Lille-Basle line between Thionville and Basle.

### The effects on freight and passenger working of the introduction of 25-kV. electrification

The present summer service improvements on the Paris-Strasbourg line were reviewed in our April 28 issue, page 468. An official source\* has given some details of the accelerations planned when the whole line is electrified in May, 1962. The 8 a.m. train from Paris will then be timed to reach Strasbourg in 4 hr. 14 min. as against the present 4 hr. 43 min., and accelerations of a similar order will be extended to trains making ten or twelve intermediate stops on this route. In view of the importance of gaining passenger traffic by offering faster journeys, the work of electrification has been accompanied by civil engineering work enabling the speed limit to be raised to 87 m.p.h. on 226 out of the 312 miles.

### Station alterations

The new pattern of passenger service is making it necessary to lengthen platforms at the Gare de l'Est and other large stations in order to accommodate longer trains. It will be the aim to carry extra traffic at peak periods by strengthening formations, avoiding double-heading or the running of reliefs as far as possible. The Paris carriage depot at

\*"L'Année Ferroviaire, 1961." Article by M. Henri Lefort, Regional Manager, Région de l'Est.

Ourcq will be modernised and the sidings lengthened. Suburban traffic on the main line between the Gare de l'Est and Meaux, together with that over the branch to Gargan, will be worked by push-and-pull sets in charge of locomotives from the common pool, which therefore will be employed on other duties when not needed for suburban trips. Suburban traffic from this terminus is characterised by short and intensive peaks to a greater extent than that from the other main-line stations in Paris. On a normal weekday 63 per cent of the passengers leaving the Gare de l'Est do so between 6 p.m. and 8 p.m. The corresponding average figure for the Paris stations as a whole is 53 per cent.

#### Locomotive policy

Allocations of locomotives will be planned to make the best use of their capacity for high daily mileages, their duties taking them over all the electrified lines in the region. Four depots will handle routine maintenance—Paris (La Villette), Mohon (Charleville), Thionville, and Strasbourg. Intermediate overhauls for the whole region will be undertaken at Mohon, and later at Strasbourg; major overhauls for electric locomotives both of the Est and Nord regions will be concentrated at Hellemmes. Other existing depots will serve simply as crew-changing points, and to a growing extent such changes will be planned to take place at stations rather than depots. Motive power control offices will be reduced from eight to four, situated at Paris, Rheims, Metz, and Strasbourg, and it is only at these points that spare locomotives will be held.

The final number of electric locomotives for the whole region will be 383, of which the most numerous will be the mixed traffic "16500" class (110), the a.c./d.c. rotary-converter "14100" class

for heavy freight (102), and the "16000" class for express traffic (35). No more of the "14100" class are being ordered. These locomotives date from the original Valenciennes-Thionville electrification, like the "12000" class with rectifiers, and the "13000" class with a.c. motors, of which 79 and 53 respectively will remain in the final stock of the region.

The proximity of the Région de l'Est in North East France to the low-frequency a.c. systems of Switzerland and Germany made Strasbourg the natural base for the four prototype dual-frequency locomotives of the S.N.C.F., and they are to continue at that depot. One of these locomotives, No. 20104, took part last year in comparative trials on the Berne-Lötschberg-Simplon Railway with a B.L.S. Bo-Bo of Class "Ae 4/4." The runs were made between Frutigen and Kandersteg, and on each occasion the test train had to stop and re-start on a gradient of 1-in-37 with reverse curvature of 328 yd. rad. Maximum tractive effort recorded at the drawbar with No. 20104 was 31 tonnes, and the heaviest load was 653 tonnes.

#### Test results

Since that time the locomotive has undergone further tests in France, in the course of which this 88-tonne unit started a train of 2,733 tonnes on a gradient of 1-in-100. While accelerating the train from standstill to 6 m.p.h., the factor of adhesion averaged 40.5 per cent, reaching a maximum of 45 per cent. No. 20104 is one of the pair equipped by Brown-Boveri, both of which were fitted originally with single-anode mercury-arc rectifiers (see our March 13, 1959 issue). Subsequently, as recorded in our issue of July 29 last year, the other locomotive of the pair, No. 20103, has received a silicon rectifier installation, and with a

continuous rating of 4,880 h.p. is the most powerful locomotive in the world at the present time with that form of semiconductor rectification.

#### Multi-system locomotive prototype

When the line from Neufchâteau to Dijon is electrified, the Région de l'Est will need certain locomotives able to work on 1,500V. d.c. and 25 kV. a.c. To meet requirements of this kind, locomotives of Class "16500" and Class "16000" have been constructed as dual-system prototypes. The former works at much reduced power on d.c., its d.c. equipment being intended only to allow it to start a train and haul it a short distance to a point where the 25-kV. catenary begins. Conventional resistance control with the motors in series is used for this duty, and while running on d.c. sections the motors are not forced-ventilated, although the resistances are ventilated by the two blower sets which cool the transformer oil radiator during a.c. working. The Class "16000" prototype has been adapted on similar lines, but with approximate equality of power output on the two systems.

There are several through services between Holland, Belgium and the Région de l'Est via Thionville, and so the region is likely in the future to use three-system locomotives such as those under construction for 1,500 and 3,000V. d.c. and 25 kV. a.c. These two prototypes are mechanically similar to the "9400" class of the d.c. lines, and on all supply systems the traction motors will be fed through control resistances at 1,500V. When operating on 25 kV. a.c., the d.c. will be taken from silicon rectifiers. The same power output (3,000 h.p.) will be available on any system. With these locomotives, through working between Amsterdam, Brussels, Thionville, and Basle would be practicable.

#### EXPRESS TRAIN FOR KENT COAST LINES



New electric stock for Kent Coast electrification, Phase 2. Commonwealth bogies are used except where motored bogies are fitted



# PERSONAL

## British Transport Commission

MR. S. E. RAYMOND, Assistant General Manager (Traffic), British Railways, Scottish Region, has been appointed Traffic Adviser, British Transport Commission.

MR. W. N. ROBERTS, Acting Chief Assistant (Passenger) to the Commercial Officer, Euston, British Railways, London Midland Region, who is to retire, joined the Midland Railway, at Derby, in 1916. He was transferred to the General Superintendent's Office (Passenger Commercial), in 1926, and six years later worked in the Road



Mr. W. N. Roberts

Transport Section at Euston. In 1936, Mr. Roberts acted as Assistant District Goods & Passenger Manager, Derby, and later that year went to Birmingham as Temporary Assistant District Passenger Manager. From 1938-45 he was Assistant to the District Goods & Passenger Manager, Derby, and later became Assistant for Trade Advertising to the Chief Commercial Manager, Euston. Mr. Roberts became District Passenger Manager, Euston, in 1947, and since 1959 he has been Acting Chief Assistant (Passenger) to the Commercial Officer.

MR. D. R. TAYLOR, A.M.I.MECH.E., A.M.I.LOCO.E., Assistant Works Manager, Shildon, British Railways, North Eastern Region, who, as recorded in our April 21 issue, has been appointed Works Manager, Carriage & Wagon Works, York, was educated at the Queen Elizabeth Grammar School and the Technical College, Darlington. He entered the railway service as a premium apprentice at the Darlington Locomotive Works of the London & North Eastern Railway, in 1937. In 1944 he was appointed Works Assistant at Shildon Wagon Works and subsequently held similar appoint-



Mr. D. R. Taylor

ments at Gateshead and Darlington. In 1946 he was appointed Assistant to Works Manager at Shildon and later became Assistant Works Manager, Faverdale Works, Darlington, Works Manager, Walker Gate, and Assistant Works Manager, Shildon, the position which he now vacates.

MR. H. L. BRAZIER, who has been acting as Chief Secretary of the British Transport Commission, retired on May 31.

MR. W. H. CHALLIS, M.I.R.S.E., Principal Executive Assistant to the Signal Engineer, London Transport Executive, who, as recorded in our May 19 issue, has been appointed an Officer of the Executive with



Mr. W. H. Challis

the title of Signal Engineer, joined the Metropolitan Railway, in 1915, as an improver. In 1923 he transferred to the London Electric Railway, was employed in the office of the Signal Engineer, and became Chief Draughtsman in 1931. He was appointed Indoor Assistant in 1938, and Principal Signalling Assistant in 1950.

MR. R. DELL, O.B.E., M.I.E.E., M.I.MECH.E., M.I.R.S.E., Signal Engineer, London Transport Executive, who, as recorded in our May 19 issue, has been appointed a Chief Officer of the Executive with the title of Chief



Mr. R. Dell

Signal Engineer, was educated at the Polytechnic, Regent Street. He entered the Signal Department of the London Underground Railway, in 1915, as an apprentice, and served during the 1914-18 war with the Army Service Corps. In 1922 he was appointed New Works Assistant and became Outdoor Assistant (New Works & Maintenance), three years later. After the formation of the London Passenger Transport Board in 1933, he was appointed Assistant Signal Engineer (Construction) and in 1936 became an officer of the Board. In 1940 he was appointed Joint Signal Engineer and in 1942, Signal Engineer. Mr. Dell was awarded the O.B.E. in the 1958 New Year Honours List, and was elected President of the Institution of Railway Signal Engineers in 1949.

MR. E. C. E. LYON, Assistant Electric Traction Engineer, Chief Mechanical & Electrical Engineer's Department, Ilford, British Railways, Eastern Region, who has been appointed Electric Traction Engineer, Ilford, began his career in 1932, at Stonebridge Park with the former London Midland & Scottish Railway. In 1937 he became



Mr. E. C. E. Lyon

a draughtsman in the drawing office there, and, after war service, was appointed Depot Foreman in 1949. Mr. Lyon was appointed Assistant Rolling Stock Engineer, Ilford, Eastern Region in 1956, and became Rolling Stock Engineer, London Midland & Eastern Regions, London Area later the same year. He was appointed Assistant Electric Traction Engineer, Ilford, in 1958, the position he now vacates.

### Industrial

MR. A. R. CROFT has been appointed Chief Designer, Conveyancer Fork Trucks Limited in succession to the late MR. J. D. COLDWELL.

MR. C. SMITH, Contracts Manager of the Resistor Division of Fawcett Preston & Co. Ltd., a member of the Metal Industries group, has been appointed Sales Manager of the division.

MR. W. E. VESEY, Managing Director of Christie & Vesey Limited, has been elected President of the British Wood Preserving Association for the year 1961-62. Mr. Vesey is also Chairman of the Sleeper Section of the Timber Trade Federation.

MR. K. J. BUSH has been appointed Assistant Sales Manager, Mechanical Thermometer Division, Cambridge Instrument Co. Ltd. MR. W. C. ORFORD, MR. S. V. J. CRUMP, and MR. W. A. HALL have been appointed Assistant Resident Engineers at Nottingham, Bristol, and Manchester respectively.

### Institution of Civil Engineers

The Institution of Civil Engineers has announced its awards for the 1959-60 session which are as follow:—

#### Telford Gold medal

SIR OWEN WILLIAMS and MR. O. T. WILLIAMS, his son, for their joint paper, "The London-Birmingham motorway (Luton-Dunchurch): design and execution."

#### James Watt medal

MR. P. CHALMERS and MR. A. C. LAYHE jointly (co-authors with MR. A. DEAN), for their paper "The mechanisation of railway civil engineering maintenance work."

#### George Stephenson medal

MR. G. M. BINNIE, MR. J. G. CAMPBELL, MR. N. H. GIMSON, MR. F. F. LANCASTER-JONES, and MR. C. GILLOTT, joint authors of the paper, "The Dokan project: the flood-disposal works and the grouted cut-off curtain."

#### Coopers Hill War Memorial prize

MR. W. N. ALLAN, and the late MR. H. A. W. MORRICE, for the paper "Planning for the ultimate hydraulic development of the Nile valley."

### Overseas

MR. G. P. G. MACKAY, M.A., Deputy General Manager, East African Railways & Harbours, who as recorded in our June 2 issue, has been appointed General Manager, was educated at Huntly Gordon School and Aberdeen University. Mr. Mackay had two years' special training with the London & North Eastern Railway before joining the Kenya & Uganda Railways & Harbours as an



Mr. G. P. G. Mackay

Assistant Traffic Superintendent in 1941. Early in 1942, after experience in various districts, he was transferred to Headquarters, Nairobi, as Personal Assistant to the then Superintendent of the Line. In 1948 he moved to the General Manager's Office as an Administrative Assistant, and in 1952 became Principal Assistant to the General Manager. He was appointed Chief Operating Superintendent in 1955, and, in 1960, became Deputy General Manager. Mr. Mackay was awarded a United Nations Fellowship in 1954 for the study of transportation.

MR. H. D. SINGH, B.SC., Senior Deputy General Manager of the Eastern Railway of India, who, as recorded in our issue of June 2, has been appointed General Manager, Southern Railway, was born in 1907. Mr. Singh graduated in mechanical and electrical



Mr. H. D. Singh

engineering from Banaras Hindu University, in 1930. He joined the Indian Railway Service of Engineers, in 1931, and was posted to the Stores Department, East Indian Railway. During the 1939-45 war Mr. Singh was District Controller of Stores at Howrah and Lillook. After Independence, he officiated as Deputy Controller of Stores, East Indian Railway. He was transferred to the Chittaranjan Locomotive Works, in 1950, when its construction was nearly complete. In 1955 he joined the Railway Board's office as Director, Railway Equipment (later redesignated as Director, Railway Stores). In 1957 he was a member of the Steel Mission which went to Europe to purchase track material for the Indian Railways. The same year he also visited Burma and Thailand to negotiate the purchase of teak for the Indian Railways. He became Senior Deputy General Manager, Eastern Railway in 1959. Mr. Singh has represented the Chittaranjan Locomotive Works and the Railway Board in the Inter-Railway Golf Championship.

MR. N. R. MCMORRAN, Traffic Manager for Australia, Canadian Pacific Railway, retired on May 31. He will be succeeded by MR. H. F. BOYER, who will have his headquarters at Sydney. MR. E. F. BIRDSALL is to be Assistant to Traffic Manager, Australia, and MR. I. J. GLEN will be District Traffic Manager, Melbourne.

MR. LEWIS J. BURGER has been appointed President of LeTourneau-Westinghouse Company, succeeding MR. MERLE R. YONTZ. Mr. Yontz had served as President since the company's formation in 1953. He has accepted a position with the Caterpillar Tractor Company.

### Ministry of Transport

MR. R. N. HEATON has been appointed a Deputy Secretary at the Ministry of Transport with responsibility for roads and traffic. Mr. Heaton will succeed MR. J. E. HAMPSON, C.B., who is vacating his present post at his own request to become the Principal Establishment & Organisation Officer.

# NEW EQUIPMENT *and Processes*



## DOPPLER RADAR SYSTEM

The primary retarders installed at Margam marshalling yard release cuts at speeds computed from their weight and rollability, so that they all take a constant running time to the secondary retarder, thus preserving separation between the cuts. To release the cut at a particular speed, the actual speed must be known while the cut is in the retarder.

To enable this to be ascertained a doppler radar system is provided at each retarder, with an aerial unit mounted in the centre of the track, just beyond the retarder. The aerial radiates a v.h.f. signal in a narrow beam. Part of the signal is reflected back at a higher frequency by the approaching cut. The difference in frequency between the transmitted signal and the received signal is proportional to the speed of the cut.

The pressure applied to the wheels by the retarder is determined by the difference between the actual and the required speeds, and by the weight of the wagons.

Further particulars of the A.E.I.-G.R.S. radar unit are obtainable from E.M.I. Electronics Ltd., Hayes, Middx.

## BONDED COATINGS

Dry-film bonded coatings of molybdenum disulphide have shown themselves to be most useful for solid lubrication, both during running-in and where operating conditions are particularly severe, as for example when working parts are subjected to extreme temperature and/or pressure.

Moly-Paul Moly-VI-Bond is claimed to be one of the most versatile and economic of these coatings. It has now been found possible to increase still further the resistance of Moly-VI-Bond to abrasion, to oxidation, and to attack by acids and alkalis, by the addition of some 2 per cent of a special composite-type resin which also improves the elasticity of the film, so facilitating subsequent processing of light alloys, tin plate, steel, and so on.

The new "improver" is colourless, non-toxic, and free from taste or smell. In use it is simply mixed with Moly-VI-Bond when the mixture has a minimum shelf life of four months. Application of the bonded coating is unchanged except that hot curing is essential (for example, 1½ hours at 180 deg. C. or 3/5 minutes at 340 deg. C.).

The illustration shows an application of the improver for Moly-VI-Bond to a

pneumatic valve for a diesel engine starter motor, rotating at 2,250 r.p.m. The left-hand view shows an untreated surface, and that on the right one which has been subjected to treatment.

Additional information is obtainable from K. S. Paul (Molybdenum Disulphide) Limited, Angel Road, London, N.18.

## TUNING FORK

A transistorised tuning fork has been introduced to provide stable 50-cycle reference frequency. It is said to be especially valuable:

- (1) In tachometer testers operating on the stroboscopic principle.
- (2) As a reference signal for accurate speed control of 50-cycle synchronous motors.
- (3) In time control equipment.

A low temperature co-efficient tuning fork forms a resonant element in a closed loop transistorised amplifier. The amplifier is coupled to the tuning fork by a magnetic sensing coil and a magnetic-drive coil.

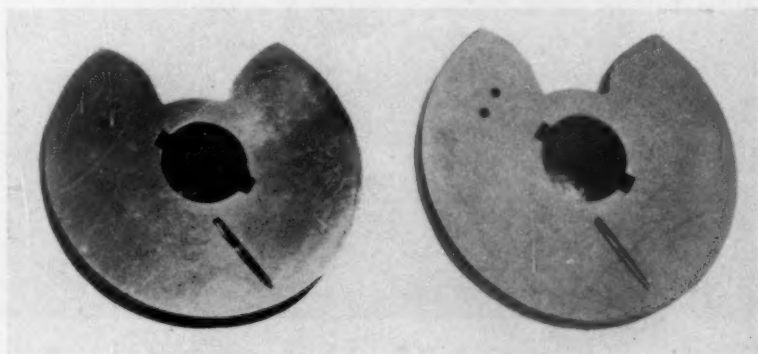
Oscillations are started by means of a striking knob and thereafter maintained by the transistor amplifier. The output from the fork is in the form of a narrow triangular pulse once every cycle and is suitable for direct driving of stroboscopic tubes or as a synchronising signal for an oscillator which drives a synchronous motor. The circuitry of the tuning fork is transistorised throughout.

At 20 deg. C. the frequency of oscillation of the fork is  $50 \pm (5 \times 10^{-8})$  cycles per second. The amplitude of the pulse is not less than 175 volts positive.

The tuning fork operates from a 235V.  $\pm 5$  per cent, 50 cycles supply.

Dimensions are 4½ in. wide  $\times$  10 in. deep  $\times$  5½ in. high, and the weight is 12 lb.

Fuller particulars are obtainable from Bryans Aeroequipment Limited, 1 and 15, Willow Lane, Mitcham, Surrey.





### SPIKE-DRIVING MACHINE

The Auto-Spiker track-maintenance machine automatically sets spikes for driving, pulls the sleeper up against the rail, and drives up to four spikes simultaneously.

The operator has complete control of spike feeding and setting. The feed attachment is composed of a spike magazine, with air-controlled feed, and a magnet spike holder with automatic retract mechanism. The automatic feed can, if required, be factory-installed on existing R.M.C. SpikeMasters.

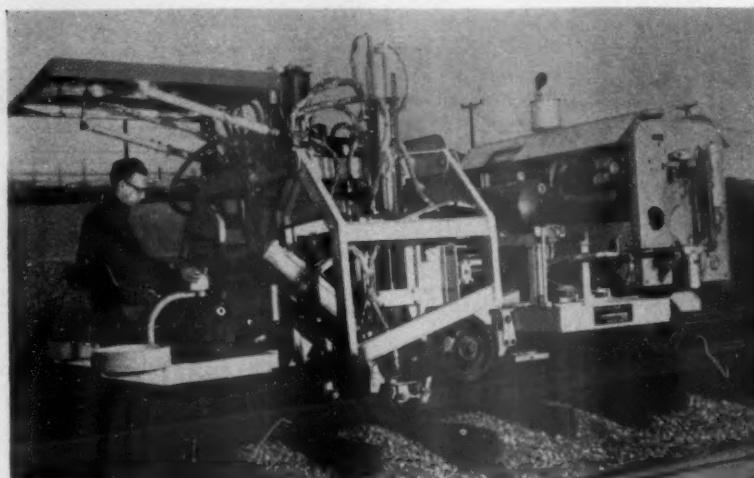
The sequence of operation is: (1) machine spotted hydraulically; (2) sleeper nipped up to rail; (3) spikes automatically fed to a holding position under the driving guns; (4) spike located over hole in bearer plate; (5) spikes driven, either separately or up to four at a time. The holders automatically are withdrawn as the spike starts to drive.

Additional details are available from Railway Maintenance Corporation, Box 1888, Pittsburgh 30, Pa., U.S.A.

### TRACTOR SHOVEL

A newcomer to the heavy-duty bulk materials handling equipment is the Yale Trojan Tractor Shovel Model 204. This is a two-cu. yd. machine of 12,000 lb. lifting capacity, having a maximum lift height of 10 ft. 9½ in. with an outreach of 32 in. from the front of the tyres. At a lift height of 7 ft. the outreach available is 57 in.

The tractor has a four-wheel drive and is powered by a Leyland UE350 diesel



engine rated at 105 b.h.p. at 2,200 r.p.m. Transmission is by the Allison torquatic converter, with planetary gear drive to the axles. Travel speeds, in forward and reverse, are low, 3 m.p.h.; 2nd, 8 m.p.h.; and 3rd, 21 m.p.h. Design features which are claimed to provide a high degree of safety and maximum operating efficiency are the reverse curve safety arms and the straight-line thrust cylinders. A vacuum booster is provided to assist the operation of the four-wheel hydraulic brakes. Steering is of the cam and lever type, with hydraulic booster. The driving cab is fully enclosed, having a sliding window at the rear and windscreen wipers on the forward screen. Scarifier tooth attachments are provided on the rear of the

shovel and a wide range of other attachments is available. No hydraulic connections require to be broken when interchanging any of this auxiliary equipment.

Further details concerning this tractor may be obtained from the Yale & Towne Manufacturing Company, Wednesfield, Wolverhampton.

### STANDARD BEARINGS

To enable a wide variety of requirements to be met from stock a large selection of standard bearings and anti-friction material is available. Wrapped bushes are produced in 114 inch sizes and 137 metric sizes. Finish-machined bronze bushes can be selected from 104 sizes and dry bearings are stocked in 65 inch sizes and 50 standard metric sizes.

The availability of a large number of sizes ex stock, simplifies work in the drawing office and enables manufacturers to carry a minimum stock.

Additional particulars are obtainable from the Glacier Metal Co. Ltd., Alpertown, Wembley, Middlesex.

### CRACK DETECTOR

The "Portamag 850" magnetic crack detector has what is claimed to be the unique feature of a thumb switch mounted on one electrode for controlling the 850 amp. a.c. output current. This switch operates a 12-V. relay in the primary circuit and gives press-on, release-off control.

Other features are a large clear-reading ammeter to indicate that current is flowing, mains-indicator lamp, and storage space for the 6-ft. cables within the weather-proof case.

The "Portamag 850" is supplied for 240V. a.c., mains consumption is 10 amps. Dimensions are: height 10 in., width 9 in., and length 14 in. The weight is 45 lb.

Further information is obtainable from Research & Control Instruments Ltd., 207, Kings Cross Road, London, W.C.1.



## Sir Brian Robertson presentation

Last week past and present members of the British Transport Commission, and others who have held high office with that body, entertained to dinner at the Charing Cross Hotel, London, Sir Brian Robertson, the retiring chairman of the Commission. The occasion was taken to present him with a portrait painted by Sir William Hutchison and a displayed list of donors of the portrait. Reproductions of the portrait and of the list of donors are illustrated on this page.

Sir Brian Robertson, who formally retired on May 31, was also presented with a Persian rug at a luncheon given him by senior officers.

## Engineering at Colchester

On Sunday, May 28, engineers of the Eastern Region of British Railways rolled into position the new 540-ton bridge which now carries the main London-Norwich railway lines over the dive-under which has

been constructed for through electric trains from Liverpool Street to Clacton. These will come into service some time next year.

The bridge is one of the chief features in a big programme of track work being carried out in connection with the complete reconstruction of Colchester Station. When work is complete in 1962, main-line trains in the area will be able to reach speeds of up to 90 m.p.h.

The bridge builder was Joseph Westwood & Co. Ltd., and the contractor was the Cementation Co. Ltd.

## London-Moscow daily service

The Eastern Region of British Railways introduced a direct daily service between London (Liverpool Street) and Moscow—via Harwich and the Hook of Holland—on Sunday, May 28.

The first stage of the 1,800-mile journey begins each morning at Liverpool Street Station where passengers join the "Day Continental" boat train for Harwich. After a 6-hr. sea crossing to the Hook of Holland, passengers board the special



Sir William Hutchison's portrait of Sir Brian Robertson

sleeping car/restaurant train which will take them direct to the Soviet capital, passing through Holland, West and East Germany, Poland, and Russia. At the U.S.S.R. frontier point the railway bogies will be changed to the Russian Railways' 5-ft. gauge. The London to Moscow journey will take nearly 60 hr. and a similar daily service will operate in the reverse direction.

The direct rail/boat link between London and Moscow was first established last year, with four journeys in both directions each week. The new daily service—organised in conjunction with the railway administrations of Holland, West and East Germany, Poland, the U.S.S.R. and the Zealand Steamship Company—is the result of the public interest aroused.

## Donors of the Portrait of General Sir Brian Robertson Bt.

GCB, GBE, KCMG, KCVO, DSO, MC

### SIR JOHN BENSTEAD

HUGH P. BARKER	LORD RUSHOLME
SIR IAN BOLTON	MAJOR-GENERAL G. N. RUSSELL
D. H. CAMERON OF LOCHIEL	JOHN RYAN
F. DONACHY	SIR LEONARD SINCLAIR
K. W. C. GRAND	T. H. SUMMERSON
R. F. HANKS	SIR LANDALE TRAIN
SIR HARRY METHVEN	A. B. B. VALENTINE
F. A. POPE	SIR PHILIP WARTER
J. RATTER	SIR REGINALD WILSON
JAMES AMOS	M. HOLMES
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F. D. M. HARDING	VISCOUNT SLIM OF YARRALUMLA
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F. G. HOLE	MAJOR-GENERAL
Dr. R. F. Q. DEN HOLLANDER	L. WANSBROUGH-JONES
T. H. HOLLINGSWORTH	GENERAL SIR DARIL WATSON
	MAJOR-GENERAL W. D. A. WILLIAMS

## Commonwealth Technical Training Week

British Railways, North Eastern Region, have been taking an active part in many of the exhibitions organised during Commonwealth Technical Training Week. At the Rutherford College of Technology, Northumberland Road, Newcastle, and Gateshead Technical College, Durham Road, Gateshead, apprentices were seen shown working on machines normally used in railway workshops.

Displays and exhibits, including photographs of many aspects of work undertaken on the railways, have been included in local exhibitions at Ashington, Sunderland, North Shields, Framwellgate Moor, Hebburn, Middlesbrough, Darlington, Northallerton, West Hartlepool, Bishop Auckland, York, Hull, Leeds, Batley, Otley, Wakefield, Huddersfield, Goole, Scarborough and Bridlington, and film shows have been given at a number of places throughout the Region.

At Redcar, in the Cleveland Technical College, a Railway Modernisation Exhibition has been staged. This includes diagrams and text describing the aims of the modernisation plan, with photographs of multi-unit diesel trains, diesel-electric locomotives, modern marshalling yards and goods stations.

List of donors of the portrait by Sir William Hutchison

## I.L.O. Internal Transport Committee

The Inland Transport Committee of the International Labour Organisation has ended its seventh session and has adopted the following conclusions on working conditions of railwaymen:—

- i. Railway undertakings are in the forefront of economic and social life and of national defence.
- ii. The development of technical progress on the one hand, and the concept of public service on the other, require, for the satisfactory operation of railway systems, an increasingly specialised staff motivated by a sense of responsibility towards undertakings and users.
- iii. The general conditions of work of railwaymen should ensure a reasonable standard of living, should correspond to the work performed by the different categories of staff, and should ensure stability of employment, satisfactory conditions of welfare, and social security.
- iv. Financial difficulties should not cause general conditions of work to fall below a reasonable standard.
- v. There must be understanding between railway administrations and workers' organisations.
- vi. It is essential that industrial relations between railway administrations and workers' organisations should be created, maintained or developed and that procedures of negotiation, conciliation or arbitration should be promoted in a co-operative spirit.

### Social consequences of change

The committee's conclusions concerning the social consequences of changing methods and techniques in rail and road transport reflected a desire to create a harmonious social balance in rail and road transport at a time of technological transformation.

As regards railways, the committee took into account some important changes. Among these were the following:—

- The change from steam to electric and diesel traction;
- The improvement in the capacity and specialisation of rolling-stock;
- Improvements in signalling;
- The elimination or curtailment of services, lines or tracks;
- The improved operation of marshalling yards, often with the automatic sorting of wagons;
- Mechanical equipment for the handling of goods.

## Queensland's rail problem

Mr. John Ratter presided at a dinner given by the United Kingdom Railway Advisory Service to Mr. G. W. W. Chalk, the Queensland Minister of Transport, at the Savoy Hotel, London, on Monday last. Mr. Chalk was accompanied by Mr. J. Goldston, Locomotive Engineer, and by Mr. A. Lee, Assistant Secretary of the Queensland Railway Department. He has been studying rail and road problems and most recent trends in railway development in this country for the past fortnight.

During his stay he has had discussions on railway modernisation and administration

with the British Ministry of Transport and officials of the British Transport Commission. In addition, he has visited several large industrial organisations engaged in the manufacture of railway rolling-stock and equipment.

In thanking the members of U.K.R.A.S. for the assistance that had been accorded him during his stay in Gt. Britain, Mr. Chalk explained some of the problems facing his territory. He said that it was essential to rehabilitate the Queensland railway system. In particular, the Government was engaged on a £30-million scheme to rehabilitate the 600-mile railway line connecting the port of Townsville with the Mount Isa mine. This line also serves an extensive cattle and sheep area and the Mary Kathleen uranium field.

### Impressed

Mr. Chalk said that during his visit to Gt. Britain he had been impressed by the spirit of optimism which prevailed among those engaged in the modernisation of British railways, and he had seen a number of products and practices which he felt could usefully be applied to the problem presented by the Queensland railways. He was impressed, for example, with the potentialities of the road-railer vehicle, with diesel railcars, and with marshalling yards and their equipment which he had visited.

When he returned to Australia he would take advantage of the offers of co-operation and assistance which had been offered him by the British Ministry of Transport, officers of the British Transport Commission, and the British manufacturing interests. His visit here would enable him to judge with greater knowledge the merits of the report on the Queensland railway system which was now being prepared by a firm of engineering consultants.

## Austrian engineers visit Britain

Invited by the British Government through the Board of Trade, a party of Austrian engineers paid a visit to the United Kingdom from Monday, May 22, to Saturday, May 27 last. The party, which was led by Mr. F. Lerner, comprised Direktor Dipl. Ing. H. Heitzer, Mr. L. Gross, and Mr. L. Handler. All are of Simmering-Graz-Pauker A. G. of Vienna.

The aim of the visit—arrangements for which were made by U.K.R.A.S.—was to inspect diesel engines and electrical equipment for incorporation respectively in Simmering-Graz-Pauker railway locomotives and power stations. Visits were made to several British manufacturers.

## Indian and Pakistan reunion

The annual reunion and dinner of the Indian and Pakistan Railways was held at the Rembrandt Rooms, London, on May 26. The chair was taken by Mr. F. E. Musgrave, formerly General Manager, Assam Bengal Railway. Mr. P. C. Kapoor, Railway Adviser to the High Commissioner for India, who was invited to be the speaker, was unable to attend due to absence abroad; his place was taken by Mr. H. H. C. Barton, Chief of Railway Traction Department, Messrs. Merz & McLellan.

Mr. Barton referred to the great progress which had been made by India under the 5-year plans. Immediately before the war the originating freight traffic carried by the railways of undivided India was some 84 million tons, the total ton-mileage being about 22,000 million for a total route-mileage of some 40,000. Partition reduced the Indian route-mileage to about 34,000, yet during the last year of the first five-year plan, i.e. 1955-56, the originating freight traffic in India alone jumped to 114 million tons, with a ton-mileage of about 36,000 million. It was not possible to quote any figures for Pakistan.

### Increased traffic

The completion of the second five-year plan to schedule in March last, enabled the Indian railways to operate over 54,000 million ton-miles of freight traffic last year—an increase of about 50 per cent in five years. Passenger traffic also increased appreciably, which Mr. Barton regarded as significant since it is difficult enough on so many railways to maintain this traffic—let alone increase it.

The former North Western Railway of India pioneered diesel traction between Karachi and Lahore, some 30 years ago. This is now being extended to Rawalpindi and in the suburban areas of Karachi and Lahore. A substantial programme is in hand for converting coal-burning locomotives, retained on the Pakistan railways, to oil firing.

In addition to the extensive new d.c. electrification in the Calcutta suburban area, India has proceeded to introduce an appreciable mileage of 25kV a.c. electrification on the Eastern and South-Eastern systems, under the second plan. Trial running has commenced near Asansol.

The draft outline of the third five-year plan allocates tentatively some Rs.1,200 crores of new capital to the railways, to cope with an expected increase of more than 70 per cent in freight ton-miles, and an increase of 15 per cent in passenger traffic.

Mr. Barton expressed his indebtedness to Mr. Kapoor for the figures quoted.

The occasion, organised by Mr. N. Calder, the Hon. Secretary, was well attended, and included Sir William Stanier, who is an Honorary Member.

## Staff & Labour Matters

### Reduced working week for railwaymen

A further meeting of the Railway Staff National Council will take place on June 7, to discuss the question of a shorter working week for railway salaried and conciliation staffs.

The N.U.R. and A.S.L.E. & F. have accepted the Commission's proposals to co-operate in joint working parties to consider the implementation of a 42-hr. week for wages staff and 40-hr. for salaried grades. The T.S.S.A. wants a 38-hr. week for all salaried grades and the association's annual conference has endorsed the rejection of the Commission's offer to introduce a 40-hr. week for salaried staff.

### National Council for Omnibus Industry

At a meeting in London on May 29, the National Council for the Omnibus Industry received and recommended for acceptance the award, dated May 18, 1961, of the Board of



Arbitration set up to determine the difference arising out of the trade union claims of November 11, 1960.

The award provided increases of 11s. a week for the basic rates of drivers, conductors, and semi-skilled and unskilled maintenance workers governed by decisions of the Council; introduced a scale of added payments for early-starting and late-finishing duties; and gave time-and-a-quarter for work on Saturday afternoons. The board found that the case for an increased minimum guaranteed day and for improved "spread-over" (split-duty) payments had not been established.

The basic minimum rates of skilled maintenance workers governed by decisions of the council were increased by 6d. per hr. (21s. a week). The rate of double time will be paid to such workers for hours worked on all six public holidays. The board rejected a claim for increased overtime rates and other alterations in conditions for skilled workers. It also rejected a claim for three days' extra paid holidays for all staff.

The award is backdated to the beginning of the first full pay period following May 10, 1961. Some 100,000 workpeople in the provincial bus industry employed by private bus companies and undertakings controlled by the B.T.C. will benefit.

## CONTRACTS & TENDERS

### BOARD OF TRADE

The Export Services Branch, Board of Trade, has received calls for tenders as follows:—

#### From Portuguese East Africa:

1 tower ladder and 1 mechanical lathe with accessories for the Electricity Department of the Beira Railways.

The issuing authority is the Ports, Railways & Transport Department, Beira, to which bids should be sent. The tender No. is A/CFB/1/1-106/61. The closing date is June 21, 1961. The Board of Trade reference is ESB/16829/61. No further information is available at the Board of Trade.

#### From South Africa:

1,300,000 double coil springwashers, to specification CCE. 1/39-1961 (amended March, 1961) and to drawing Type E. 3140/4.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. A. 8669: Double Coiled Springwashers," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Local representation is essential. The closing date is June 23, 1961. The Board of Trade reference is ESB/17044/61.

1 3 panel 6-6kV. O.C.B. H.T. switchboard in accordance with S.A.R. specification ENW. 812/61 and annexure 1A

1 4 panel 6-6kV. O.C.B. H.T. switch-

board in accordance with S.A.R. specification ENW. 812/61 and annexure 1B.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.8678 Switchboards," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Local representation is essential. The closing date is June 23, 1961. The Board of Trade reference is ESB/17045.

5 to 60 four-wheeled medium weight industrial type tractors for use in railway goods yards for hauling trailers of at least 32,000 lb. gross weight, in accordance with specification Auto. 7/1961.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. F.8663: Industrial Tractors," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Local representation is essential. The closing date is June 9, 1961. The Board of Trade reference is ESB/17048/61.

#### From India:

1 water softening plant, capacity 200,000 gal. in 12 hr. Alternative quotations may be submitted for plant with capacity 200,000 gal. in 24 hr.

The issuing authority is the General Manager, Singareni Collieries Co. Ltd., Kothagudum Collieries P.O., Bhadrachellam Road Station, Central Railway, Deccan, to whom bids should be sent. The tender No. is Eng/179/61. The closing date is June 29, 1961. The Board of Trade reference is ESB/14902/61.

#### From Sudan:

Supply of hot water system installation for the New Grand Hotel, Khartoum. The work included in the contract consists of hot water service installation, complete with fittings, supply and finishing at above mentioned premises. Hot water to be supplied from boiler house to all bathrooms, general lavatory blocks, kitchen, service, wash-up rooms, pantry, Farrash room on all floors and service kitchen-bar, on terrace floor.

The issuing authority is the Office of the Controller of Stores, Sudan Railways, Stores Department, Atbara, to which bids should be sent. The tender No. is 2373. The closing date is June 19, 1961. The Board of Trade reference is ESB/15439/61.

#### From Iraq:

Construction of bridge and culverts between Ghubaishiyah and Maqil for the project of (Baghdad-Maqil-Um Qasser) standard gauge line, in accordance with the conditions and specifications which can be obtained from the Directorate-General of Railways, Baghdad West.

Tenders should be addressed to the Secretary, Tenders Opening Committee, Ministry of Communications, Baghdad, in a sealed envelope marked "Tender No. 6" for the construction of bridge and culverts Ghubaishiyah Maqil Section for the project of (Baghdad-Maqil-Um Qasser) standard gauge line. The closing date is June 11, 1961. The Board of Trade reference is ESB/17453/61. No further information is available at the Board of Trade.

#### From Pakistan:

5 electrically-driven portable jacks.

The issuing authority is the Pakistan Western Railway, Empress Road, Lahore, to which bids should be sent. The tender No. is P-277/p6/4/61. The closing date is June 20, 1961. Local representation is considered desirable. The Board of Trade reference is ESB/15475/61.

28,040 lamps MF GF clear 24V. 15W.

B/C

24,200 lamps MF GF clear 24V. 20W.

B/C

The issuing authority is the Chief Controller of Stores, Pakistan Eastern Railway, Pahartali, Chittagong, to whom bids should be sent. Local representation is considered desirable. The tender No. is P3/MB2/65/ACST/61-62. The closing date is June 15, 1961. The Board of Trade reference is ESB/17421/61.

17,000 hose pipe clips, M.S. for  $\frac{1}{4}$  in. hoses.

The issuing authority is the Chief Controller of Stores, P.E. Railway, Pahartali, Chittagong, to whom bids should be sent. The tender No. is P5/EVB/26/60. The closing date is June 7, 1961. Local representation is considered desirable. The Board of Trade reference is ESB/17424/61.

300 new railway track stay rails, in 24 ft. or 30 ft. straight lengths, approximately 60 lb. per yd.

The issuing authority is the Government of Pakistan, Department of Supply & Development, Frere Road, Karachi, Pakistan, to whom bids should be sent. The tender No. is VA-2/ICA/400/63195/16/60. The closing date is June 19, 1961. The Board of Trade reference is ESB/15869/61/ICA.

#### From Victoria:

10 signal transformers, 25 kVA., 22,000/2,200 V., 50 cycle, outdoor type, with oil.

The issuing authority is the Secretary, Victorian Government Railways, Melbourne, C.1, to whom bids should be sent. The tender No. is 61930. The closing date is June 7, 1961. The Board of Trade reference is ESB/16591/61.

14 switchboards—consisting of 400-A. oil switches, 400-A. bus-bar chambers, 100-A. fused oil switches, cable terminating boxes and metering equipment.

The issuing authority is the Secretary, Victorian Government Railways, Melbourne, C.1, to whom bids should be sent. The tender No. is 61940. The closing date is June 14, 1961. The Board of Trade reference is ESB/17060/61.

252 sets double acting sliding door operating gear.

The issuing authority is the Secretary, Victorian Government Railways, Melbourne, C.1, to whom bids should be sent. The tender No. is 61951. The closing date is June 14, 1961. The Board of Trade reference is ESB/17061/61.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

## Burnley Freight Depot

Work will start shortly on the modernisation of the freight depot at Burnley. This is another step in the London Midland Region's plan for streamlining and speeding-up freight transits. The depot, which will be in operation next year, will deal with traffic within a ten-mile radius of Burnley in addition to the freight sundries and full-load traffic now dealt with at Todmorden.

Two sheds built in 1873 and 1883 will be replaced by one modern shed constructed from standard steel components similar to those used in other London Midland Region depots, with additional sidings and cart roads. The shed will accommodate nearly 100 wagons in the received and forwarded sections.

Mechanical equipment will include a slat conveyor, an overhead railway and electric power hoist, a road weighbridge and capstans.

Office accommodation and staff amenities will also be modernised.

The contractor is the Norwest Construction Co. Ltd. of Liverpool.

## Railway Queen at Barmouth

Britain's Railway Queen, Miss Sheila Riordan of London, paid her first visit to Wales on May 23 when she arrived at Barmouth on the "Cambrian Coast Express." She was received by Mr. T. Griffiths, Relief Stationmaster, below a prominent display of the words "Creos y Barm" (Welcome to Barmouth) and introduced to Mr. J. Morgan Jones, Chairman of Barmouth Urban Council and members of the Barmouth Carnival Committee.

A large crowd was awaiting her at the station exit and, after a fanfare salute by trumpeters from the Barmouth Silver Band, Mr. Morgan Jones delivered a speech of welcome. After the presentation of bouquets and a large doll dressed in traditional Welsh costume, Miss Riordan drove through the town in an open car.

On May 24, in full regalia, she took part in the annual procession to the crowning of the

Carnival Queen of Barmouth. These proceedings were filmed by the B.B.C. television unit and televised over the Welsh transmission on May 28.

After the crowning ceremony, Miss Riordan received gifts from sections of the public of Barmouth. In her speech of thanks, she spoke of the good relations which resulted from the organisation of carnivals and the

crowning of children as symbols of good fellowship and neighbourliness as a way of life.

Members of the Council, Carnival committee, and British Railways staff assembled at the station to bid farewell to Miss Riordan when she returned to London on May 25. The station staff presented her with a silver bracelet.

## NOTES AND NEWS

**Swiss Loan for Belgian Railways.** The Société Nationale des Chemins de fer Belge has offered a Sw.Frs.50-million 4½ per cent loan for public subscription in Switzerland.

**Diesels withdrawn from service.** A complete class of 20 diesel locomotives which began operating in the London Midland Region of British Railways in 1958 has been withdrawn from service and is now standing at Derby locomotive works awaiting modification. The modifications mainly concern matters such as the generation of steam for train heating.

**Continental services and fares.** Each of the series of booklets, just issued by the Eastern Region of British Railways on Continental services and fares covering the period May 28-September 30 inclusive, has an attractive cover design appropriate to the country to which the services relate. The booklet containing the London-Amsterdam information has been redesigned and is easier to handle than previously.

**Art treasures railed from London to Holland.** On May 26 the National Art Treasures of Korea, recently shown in London, were carried by the Eastern Region of British Railways from London to Rotterdam, *en route* for The Hague. Wrapped in silk and packed box within box, the exhibits were conveyed in two vehicles attached to a train from Liverpool Street Station to Harwich.

Throughout their journey they were accompanied by attendants and British Transport Commission Police.

**Swiss loan for Eurofima.** Eurofima, the European railway equipment financing group, will float a Sw.Frs.30-million loan on the Swiss capital market to finance new rolling stock. The loan, which is underwritten by a Swiss banking consortium, will bear interest at 4½ per cent and have an average life of 11 years. The issue price will be 99 per cent.

**Ribble Motor Services.** Ribble Motor Services Limited (controlled jointly by B.E.T. Omnibus Services and the British Transport Commission) declared a final dividend of 6 per cent making 10 per cent for year to March 31, 1961 (same). The group profit was £357,220 (£362,862), after tax of £297,196 (£294,706). To general reserve, £125,000 (same).

**Canadian National Railways headquarters.** The new headquarters of the Canadian National Railways is now located on the Central Station site, Montreal. The 17-storey structure brings together the company's headquarters staff under one roof—the largest group of any Canadian industry. Accommodation has been provided in the new building for 3,000 personnel.

**West Highland timber train.** A special train of 18 wagons loaded with almost 100 tons of timber departed from Corrour Station on the West Highland line on May 17 for the Lochaber Sawmills at Corpach. See illustration on left. Some 15,000 tons of timber are ready to be moved by rail and it is hoped to produce about 1,000 tons annually in future.

**Mirreles film at Moscow.** A 20-min. colour film, "Diesel Power," will be screened daily at the British Trade Fair in Moscow by Mirreles, Bickerton & Day Limited. The film includes the manufacture, erection, and test of a KVSS16 engine, sequences at a number of installations in the United Kingdom and overseas, industrial application of dual-fuel engines and engines operating on heavy fuel with waste heat recovery, sequences of trawlers, tugs and other ships, and reference to JT and JVT engines showing locomotives in industrial service and on main lines.

**Walkie-talkie link speeds traffic.** A police officer with a walkie-talkie set sat in a railway signalbox on May 28 at King's Lynn, Norfolk, in a bid to help traffic through one of the worst road bottlenecks in the country. He told A.A. patrolmen when level-crossing



Special timber train on West Highland line between Corrour and Tulloch

gates on the by-pass were open and operated notices telling motorists whether to use the by-pass or take a town route.

**Lorry men threaten unofficial strike.** An unofficial strike over pay is threatened by British Railways lorry drivers.

**"Bargain Returns" on diesel trains.** The London Midland Region of British Railways has announced that it will experiment with especially cheap fares in the north-west to see whether this will persuade more people to use diesel trains during off-peak periods. The experiment began on June 1 and operates on the St. Helens, Wigan, and Liverpool diesel services. Fares will be just over 1d. a mile—20 to 25 per cent cheaper than present "special cheap day returns."

**"Golden Arrow" goes electric.** On June 11 the "Golden Arrow" will be hauled by a steam engine for the last time. The next day the lines between London and the Kent coast will be electrified, and the train will be hauled by an electric locomotive. The "Golden Arrow" service began on May 15, 1929. It was stopped by the war, but daily runs to Dover recommenced in April, 1946.

**Colombia rolling stock purchase.** National Railways of Colombia has ordered 15 diesel-electric locomotives and 229 freight wagons to the value of £2 million. The locomotives were ordered from the International General Electric Company and will be manufactured by the company's Locomotive & Car Department in Pennsylvania. The wagons are being purchased from the Gregg Car Co. Ltd., in Belgium.

**British Transport advertising display.** "A Poster Looks at the Travelling Audience" is the subject illustrated in the picture which appears above of one of the six window displays installed at Transad House, headquarters of British Transport Advertising. The captions below the photographs emphasise the vast number of opportunities



One of the six window displays at Transad House

there are for posters to be seen by people on the move and show the variety of sites that can be used by advertisers.

**Plastics Exhibition.** British Ermeto Corporation Limited will be showing a comprehensive range of its products at the forthcoming International Plastics Exhibition. In addition to displaying pipe couplings, valves, and hoses, recently introduced equipment will be on view. This will include high-pressure flexible hose, with twin-saddle and re-usable end fittings, together with a range of balanced and relief valves. Solid-drawn steel tube will also be exhibited.

**Hire a car from the train.** A "book a car from your train" service is now available

on British Railways diesel Pullman services from Manchester, Birmingham, and Bristol. Passengers may make arrangements with the Pullman-car conductor, either before the train leaves or at an intermediate stop, to book a private-hire car to meet them at their destination.

**Southdown Motor Services.** Southdown Motor Services Limited (controlled jointly by B.E.T. Omnibus Services and the British Transport Commission) declared a final dividend of 5 per cent tax free, payable June 27, making 7½ per cent tax free for the year ended March 31, 1961 (interim 3½ per cent less tax and final 5 per cent tax free). Net profit was £302,584 (£276,955), after depreciation £284,595 (£314,737), and taxation £207,442 (£174,110). To general reserve, £125,000 (£80,000).

**Malayan Minister at A.E.I. Works.** The Hon. Inche Sardon Bin Haji Jubir, Malayan Minister of Transport, visited the Sheffield Works of Associated Electrical Industries Limited during his recent tour of Britain under the auspices of the Ministry of Transport. The illustration on this page shows him talking to Mr. A. E. Andrew, Works Manager of A.E.I. Traction Works, and Mr. B. Rama Rao. Mr. Rao is training at A.E.I. in preparation for the position of Senior Inspector, Traction Motors at Heavy Electricals Limited, Bhopal, M.P., India.

**Closure of goods depots.** The London Midland Region of British Railways announces that the following goods depots will be closed on and from June 5: Ince and Elton (closed to all goods traffic except that for private sidings—traffic will be dealt with at Chester or Ellesmere Port); Cathcart Street, Egerton Dock, and Shore Road at Birkenhead (closed to all traffic—alternative facilities available at other goods depots in Birkenhead); Saddleworth (completely closed—traffic will be handled at Oldham (Mumps), Upper Mill, or Diggle). Upholland (completely closed—traffic will be dealt with at Wigan or Rainford Junction).



The Malayan Minister of Transport (left) talking to Mr. A. E. Andrew of A.E.I. Limited (right). Centre is Mr. B. Rama Rao (see reference on this page)





Observation Coach Train at Luchy Viaduct near Fort William

## THE WEST HIGHLAND LINE

SEE BRITAIN BY TRAIN

Scottish Region poster showing the Inverness-Kyle observation car

**Inverness-Kyle observation car.** The Scottish Region of British Railways is to introduce an observation car between Inverness and Kyle of Lochalsh from June 12 on the morning train from Inverness and on the evening train from Kyle of Lochalsh. Each will accommodate 28 seated passengers in nine twin fixed seats, six single revolving arm-chairs, and four alcove seats. Royal blue carpeting will be fitted throughout, and there will be two fans for air-conditioning. A small kitchen with combined bar is to be at the entrance to the coach. Excellent visibility will be obtained through windows which stretch from the kitchen to the wrap-round rear windows. Reproduced above is a poster issued by the Scottish Region to advertise the new cars.

**Hunslet Limited acquire company.** Hunslet (Holdings) Limited, Leeds, has acquired the whole of the share capital of Materials Handling Equipment (Great Britain) Limited of Maidenhead and London. Materials Handling Equipment (Great Britain) Limited is the sole concessionaire in the United Kingdom for the "Traveloader" heavy duty side-operating fork-lift transporters, made by Otis Elevator Company of U.S.A.; the "Lizard" electric side-operating reach trucks made by Albert Irion Nachfolger of West Germany, and the "Valmet" super straddle carriers made by Valmet Oy of Finland.

## Railway Stock Market

Any hopes of a return to aggressive buying in stock markets have been dispelled now that international uncertainties are a restraining factor. Earlier in the week there was a widespread tendency to await developments in South Africa, but the main talking point has been the further easing of the £ in relation to the dollar, which highlighted that although the trend is apparently in the right direction, so far as the engineering industries are concerned, much bigger strides must be

made in export trade. Meanwhile, statements from industrial leaders continue to emphasise that profit margins are narrowing owing to rising costs and increased competition.

Foreign rails were without any outstanding feature, and were generally well maintained, though there was not much business to test quotations. Antofagasta 5 per cent preference stock attracted a little buying, no doubt because of the exceptionally large yield of over 14 per cent, and the quotation strengthened from 33 to 33½. The ordinary stock, which yields 12½ per cent on the basis of last year's 2 per cent dividend, remained at 15½; the 4 per cent perpetual debentures were again 43½.

Chilean Northern debentures were 50, Costa Rica ordinary stock 43½ and Guayaquil & Quito assented bonds 54½. Brazil Railway bonds were 4, and Paraguay Central prior debentures 18.

San Paulo Railway 3s. units changed hands fairly actively, rising from 1s. a week ago to 1s. 10½d., but later coming back to 1s. 7½d. United of Havana second income stock has been firmer at 5½, and Mexican Central "A" bearer debentures improved fractionally to 58½.

International of Central America common shares were \$18 and the preferred stock \$103½.

Canadian Pacifics moved higher with Wall Street, and at \$49 compared with \$47½ a week ago; the preference stock improved from 60½ to 61 and the 4 per cent debentures from 56½ to 57 at which the yield is 7 per cent. White Pass shares rose from \$10½ to \$12½.

Nyasaland Railways shares were 11s. and the 3½ per cent debentures 32xd. In other directions, Midland of Western Australia £1 units of second debentures changed hands between 10s. 6d. and 11s. West of India Portuguese capital stock was 116½.

Among shares of locomotive building, engineering and kindred companies, Birmingham Wagon came back from 33s. 3d. a week ago to 32s. 9d. North British Loco.

reacted from 8s. 6d. to 6s. 6d. but, although active, Beyer, Peacock 5s. shares eased from 9s. 1½d. to 8s. 10½d., while Charles Roberts 5s. shares eased 3d. at 8s. and Westinghouse Brake at 45s. 6d. lost a small part of their recent advance. On the other hand, buyers remained in evidence for Wagon Repairs 5s. shares, which gained a further 6d. at 21s. 9d. Gloucester Wagon, however, after improving to 10s. 6d. eased to 10s. 3d.

Stone-Platt shares were 60s. 6d. in front of the dividend announcement, Leyland Motors have been firm at 98s. 4½d., and Vickers strengthened afresh to 38s. in anticipation of the annual meeting; the company's £4,000,000 Russian order emphasised the group's diversified interests. Simon Engineering 5s. shares were 41s. 6d. following publication of the annual report. Elsewhere, Hopkinsons rose to 138s. 9d.xd, but in other directions, Babcock & Wilcox reacted after their recent rise, and were 32s. 6d., compared with 34s. a week ago.

Among electricals, A.E.I. reacted from 43s. 6d. to 42s. 6d., G.E.C. from 38s. to 36s. 3d., but English Electric moved up from 35s. 6d. to 36s. 3d., while Crompton Parkinson 5s. shares firmed up from 14s. 3d. to 14s. 6d. in front of the dividend statement.

Pressed steel 5s. shares failed to hold an earlier rise, but at 27s. were virtually the same as a week ago. Dowty Group 10s. shares lost a few pence at 39s. 4½d. B.S.A. shares came back sharply to 30s. 3d. following the directors' forecast of lower profits.

## Forthcoming Meetings

June 3-8 (Sat.-Thu.). The Permanent Way Institution, annual summer convention, at Newcastle-upon-Tyne.

June 5 (Mon.). The Historical Model Railway Society, London section at Keen House, Calshot Street, London, N.1, at 7 p.m. "The Settle & Carlisle Line," Mr. N. Wilkinson.

June 15 (Thu.). The Model Railway Club at Keen House, Calshot Street, London, N.1, at 7.45 p.m. "The Southwold Railway: Part 2—The Model." A talk by Mr. E. R. Boston.

June 15-24 (Thu.-Sat.). International Construction Equipment Exhibition, Crystal Palace, London.

June 17 (Sat.). Stephenson Locomotive Society. R.C.T.S. North Derbyshire rail tour of goods lines in the Chesterfield area.

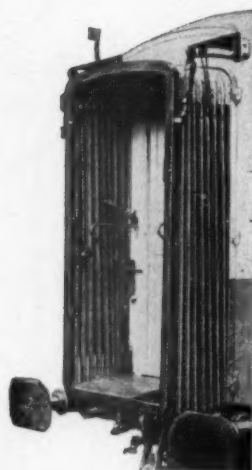
June 18 (Sun.). Railway & Canal Historical Society, North Eastern Branch. Coach tour of Sheffield & Rotherham Railway, Greasborough Railway, Thorncliffe & Elsecar Railway, Worsborough Railway and Thurgoland branch.

June 22 (Thu.). The Permanent Way Institution, Nottingham & Derby Section. Evening coach tour of Charnwood Forest, and social evening.

June 26 (Mon.). Railway Benevolent Institution, Railway Clearing House, 163 Eversholt Street, N.W.1, at 4 p.m. Annual meeting of members.

June 30-July 5 (Fri.-Wed.). Railway Students Association annual convention at Oriel College, Oxford.

July 1 (Sat.). The Permanent Way Institution, visit to Plymouth. Joint meeting with Exeter & West of England Section.



# GANGWAYS?

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The FERBATCO Air Depolarised Dry Cell using the carbon element is the most attractive Cell for Signal and Tele-communication Engineers today, both at Home and Abroad.

As this Cell is depolarised by the oxygen in the air throughout its service life, there is little alteration in the chemical structure of the special carbon electrode. The internal resistance remains unchanged as a result of which the 'on load' Terminal voltage remains almost constant.

Because of the absence of chemical change in the depolarising material this Cell has a remarkable shelf-life.

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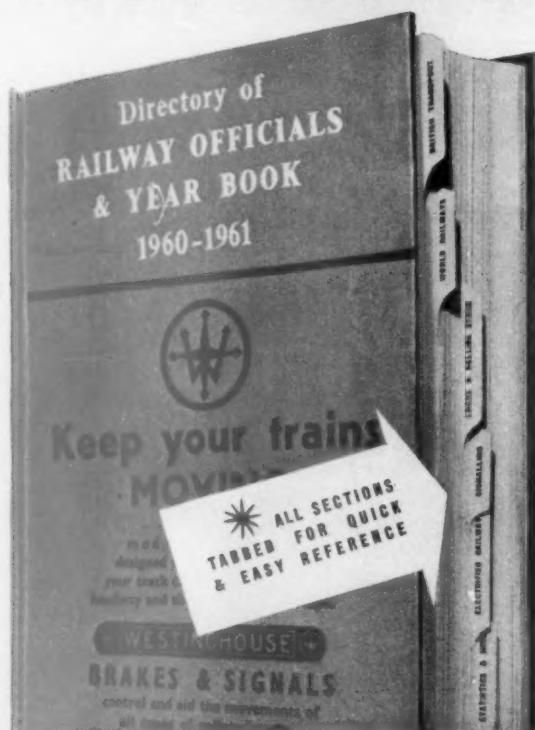


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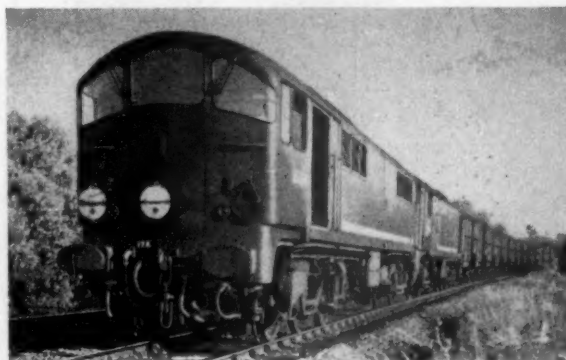
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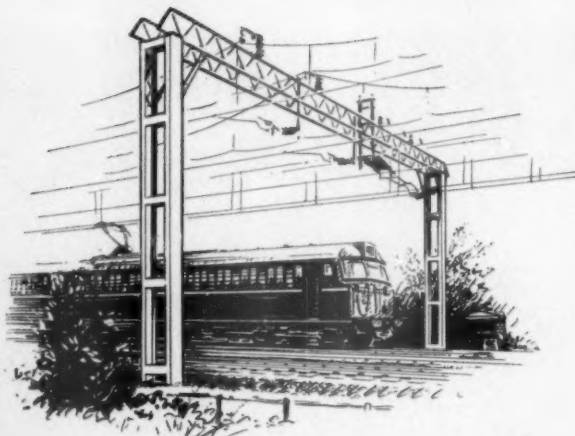
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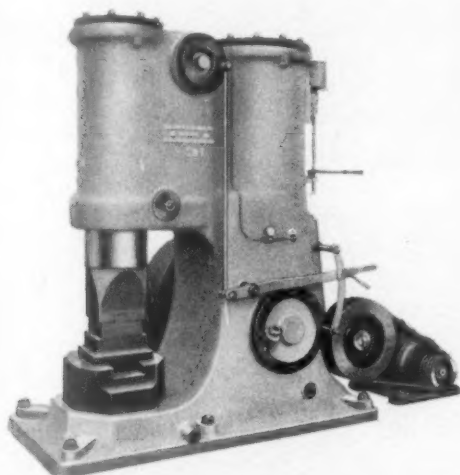
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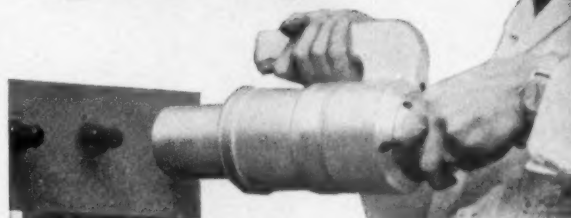
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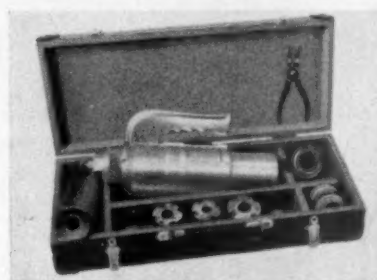
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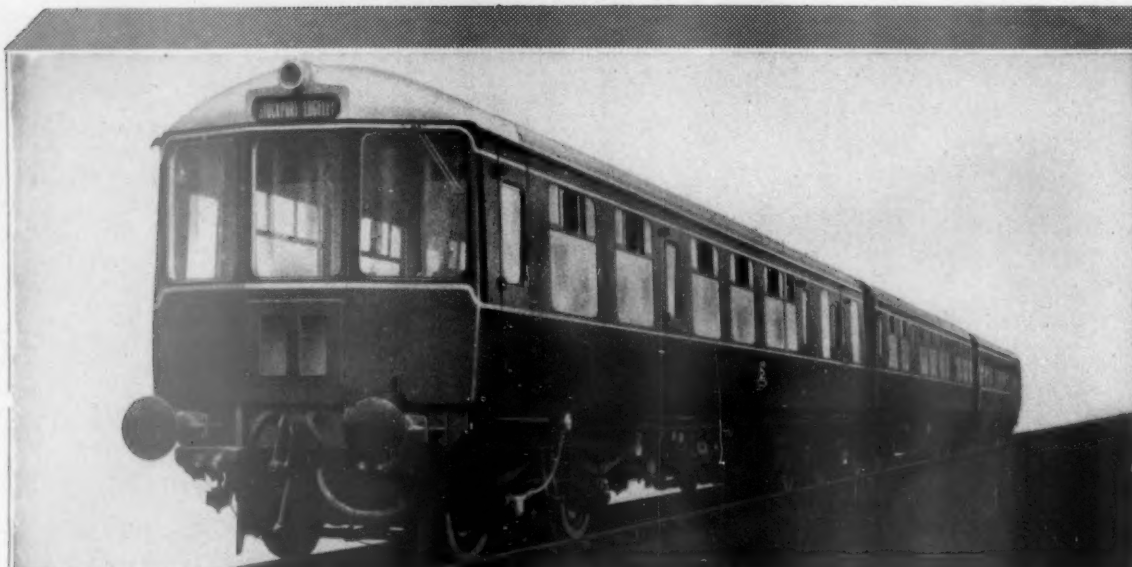
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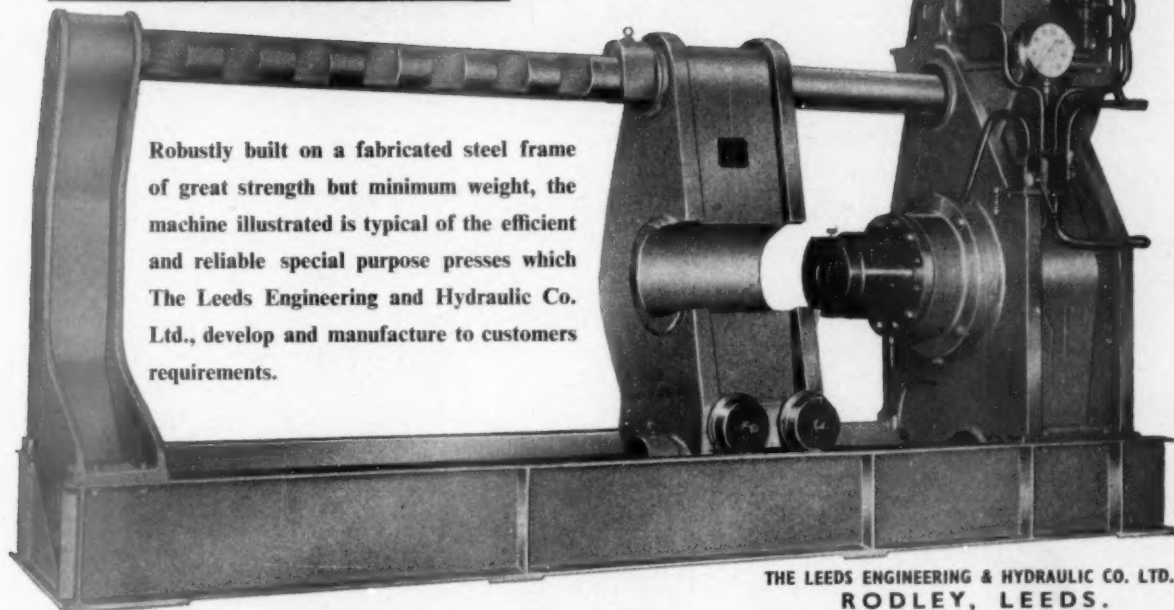
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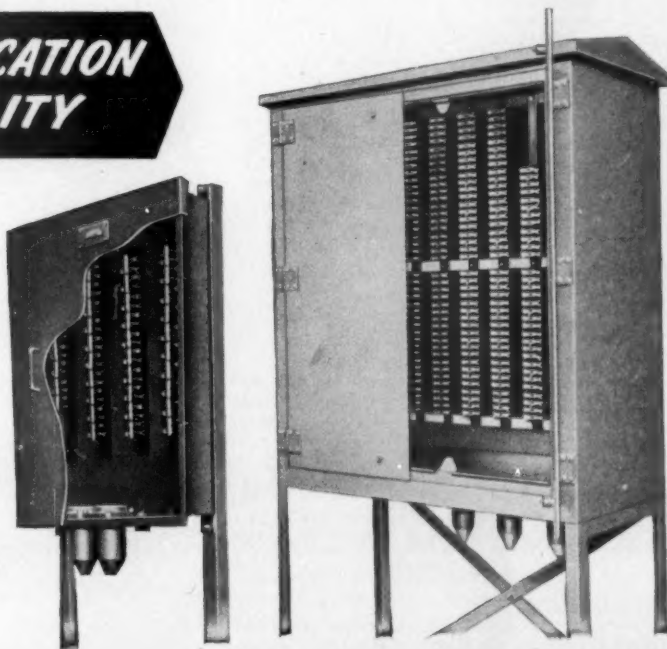
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